DEVOTED TO
TEXTILE CHEMISTRY
AND
WET-PROCESSING
BLEACHING
DYEING
PRINTING
FINISHING

MARCH 7, 1949
VOLUME 38, No. 5

AMERICAN DYESTUFF REPORTER

INCORPORATING TEXTILE COLORIST AND CONVERTER

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MAR 17

Test your whites

for consumer appeal

The obvious way to judge the sales appeal of your whites is to display your goods and your competitors' side by side and allow a neutral party to choose what he or she would buy.

If your cotton or viscose rayon is whitened with Tinopal B V A the prospective buyer time after time will pick yours, for never were there whiter whites than with Tinopal B V A.

A Geigy booklet tells the story — a trial of Tinopal B V A will prove it.

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OFFICIAL PUBLICATION
of the
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DOUBLE PURPOSE rainwear and outerwear in general can now be given DOUBLE PROTECTION — water repellency plus water borne stain resistance — with Cyanamid's PARAMUL* 115 semi-durable water repellent. Investigate its ease of application and other desirable features.

THAT SOFT TEXTURE so essential to fabric sales appeal demands fine finishing oils. Rely on Cyanamid SULFONATED OILS to achieve a smooth, soft hand. Our large scale production methods assure *uniform* high quality.

DECERESOL* OT LEVELS DYEING—AND DYEING COSTS

One of the many advantages of DECERESOL OT Wetting Agents in textile processing is its remarkable efficiency in achieving uniformly level shades in dyeing—at real savings in time and cost.

DECERESOL OT is the fastest wetting, penetrating and dispersing agent available. It has applications in all branches of the textile industry and for all fibres and fabrics, including cotton, wool, silk, linen, rayon and the newer synthetic fibres. It is supplied in liquid form, ready for instant addition to the wet processing bath, without preliminary make-up. As with all Cyanamid textile specialities — penetrants, softeners, finishes, sizing compounds, PARAMUL* Water Repellents and others —our laboratory facilities are available to assist you in its application.

Write for our booklet, "DECERESOL Wetting Agents for Textiles," which lists many ways in which these products can effect savings.

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INDUSTRIAL CHEMICALS DIVISION, DEPT. E3
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for.....

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CHLORANTINE FAST:

YELLOW	RLSW
ORANGE	3GL
BROWN	6GLLU
SCARLET	BNLL
RED	6BLL
VIOLET	2RLL
BLUE	7RLL
BLUE	BLL
BLUE	5GLL
BLUE	BCL
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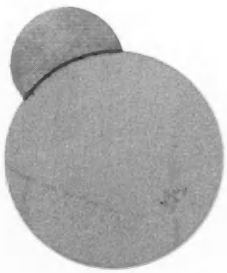

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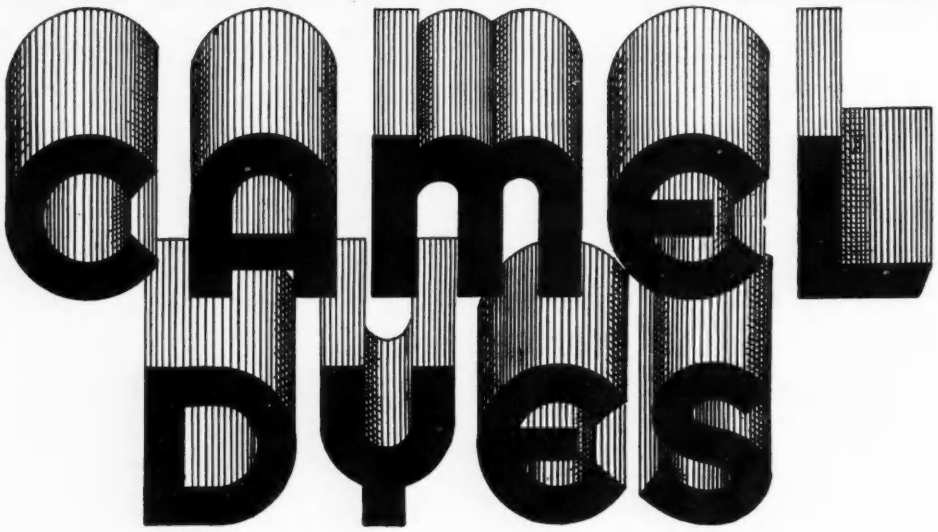

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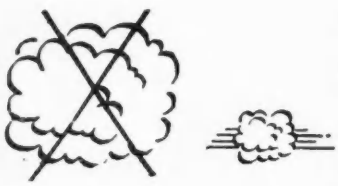
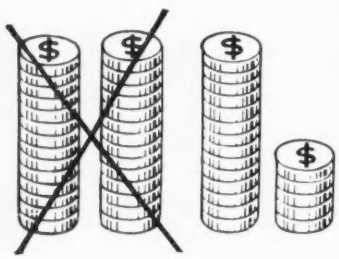
USE LESS EQUIPMENT: Two 4,000-lb. J-boxes do the work of 12 4-ton kiers. Typical daily production is 48 tons of 4.0 yard goods.

SAVE FLOOR SPACE: Complete 2-stage range requires only 1,350 square feet of floor space. To get equal production by kier bleaching would require 4,000 square feet of floor space.

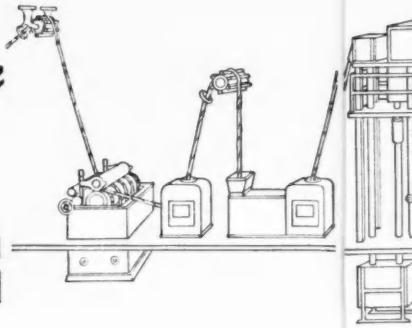


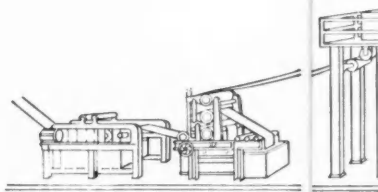
SAVE STEAM: High-speed J-box bleaching requires only 67,200 lbs. of steam to process 48 tons of cloth. Kier bleaching requires 288,000 lbs. of steam for same production.

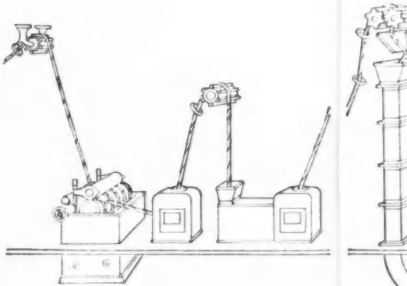


SAVE CHEMICALS AND LABOR: Savings up to 40% in the cost of chemicals and labor are achieved in the two-hour J-box bleaching process. In kier boiling and bleaching, there is a time loss of 18 to 24 hours if bleach is not satisfactory.

When you buy a Butterworth Continuous Bleaching Range (either DuPont or Becco process), you buy a *complete operating job,* including motors, instruments and auxiliary equipment. It means *one* responsibility for the success of your installation. We will be glad to work with you on your plans for high-speed J-box bleaching.







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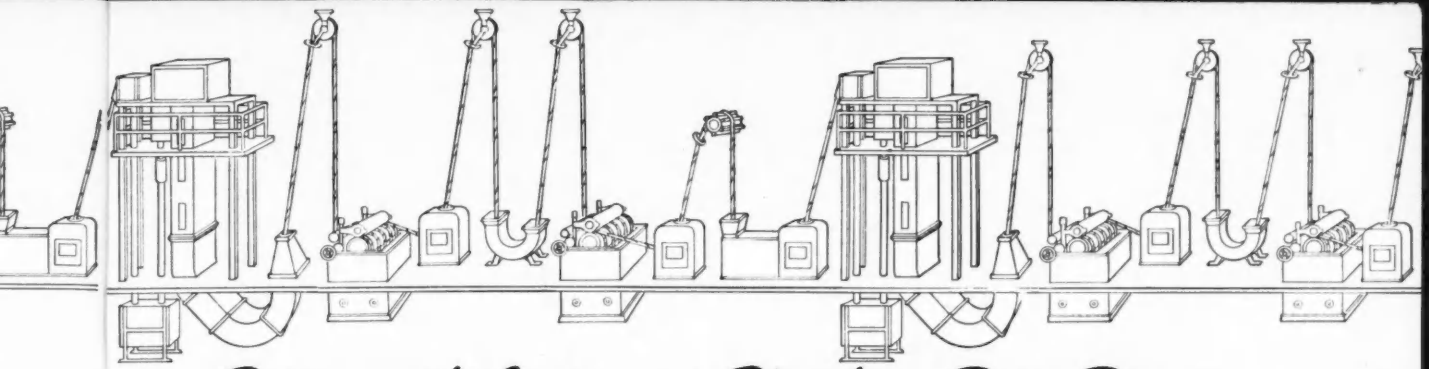
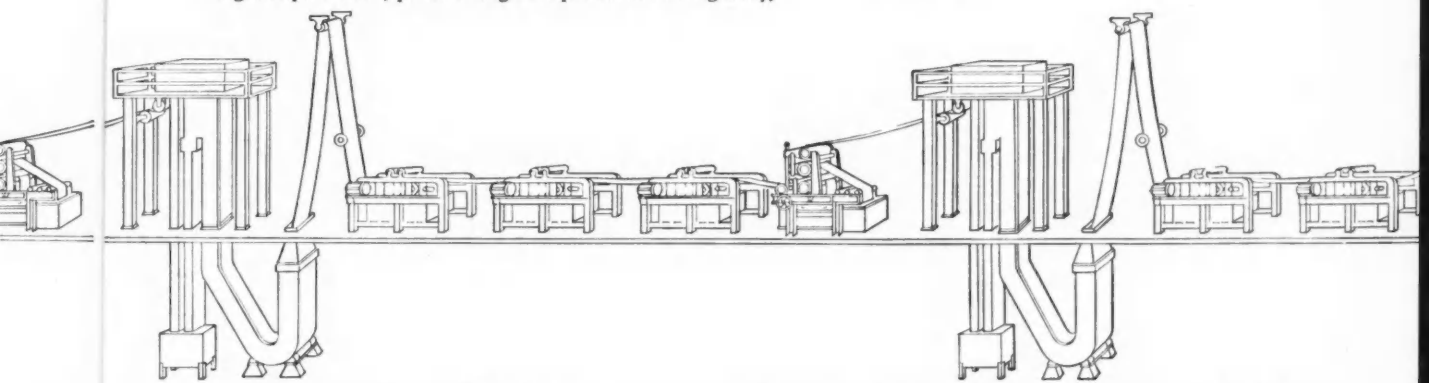


Butterworth Continuous Bleaching Rope Range (DuPont Process)

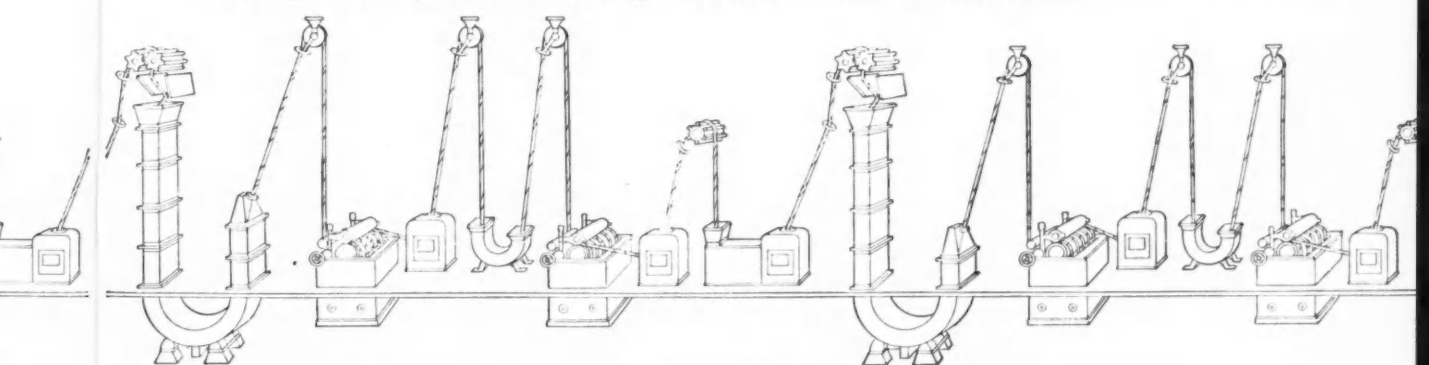
Cloth is washed in a Tight Rope Washer, passes through a Squeezer and enters a Caustic Saturator where it is impregnated with caustic soda solution. It goes through a pot-eye into the steaming tube of the J-box. After proper steaming, the goods pass directly into the J-box through special interlocking reels and plaitor mechanism and are folded in uniform condition front to back as well as across the width of the J-box. Cloth is next washed in a Tight Rope Washer, passes through a Squeezer and timing Scray, then passes through another Tight Rope Washer and Squeezer. This is followed by application of hydrogen peroxide in a Peroxide Saturator. Goods are then passed through a pot-eye, steaming tube and J-box, same as previously described. Goods pass through a Tight Rope Washer and Squeezer, thence into a Scray and finally are washed in a Tight Rope Washer and delivered through a Squeezer.



Butterworth Continuous Bleaching Open Width Range

(DuPont Process)

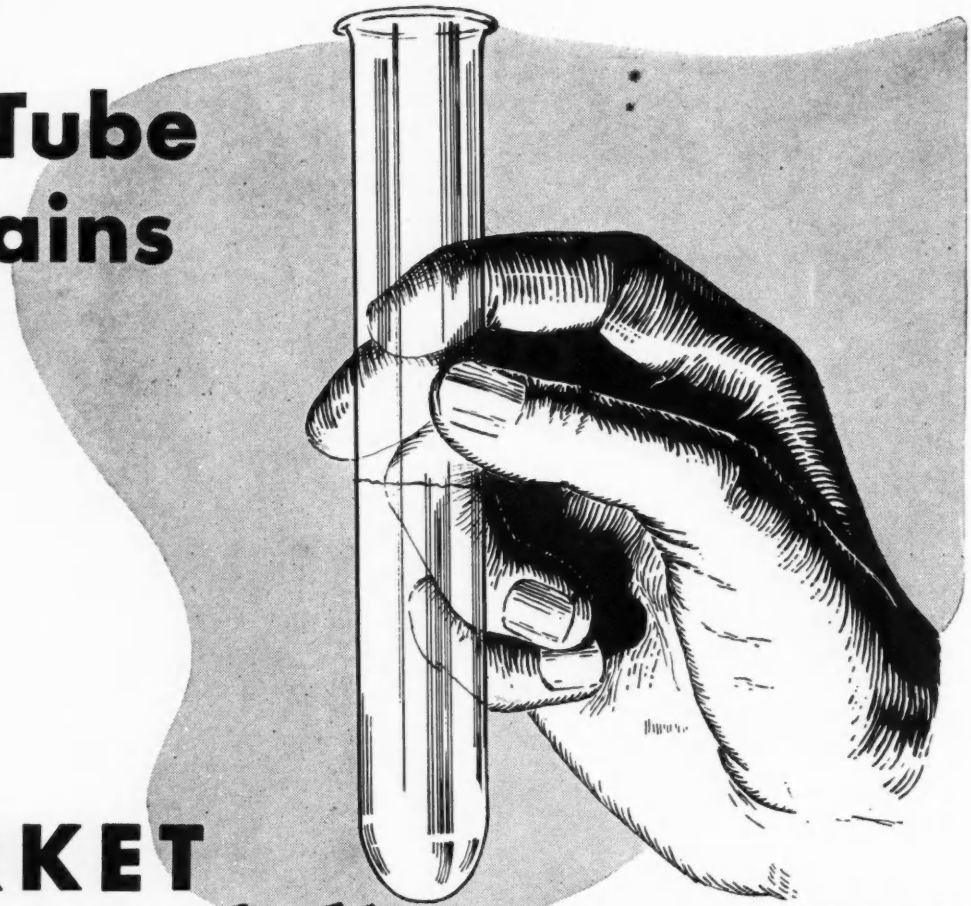
After washing in a 6-Roll Horizontal Washer, the cloth is passed through a Caustic Saturator, where it is thoroughly impregnated with caustic soda solution. Cloth is then steamed in heater tubes and plaited down into the J-box. Guide rolls are at the top of each leg of the heater tube. Leaving the J-box the cloth is thoroughly washed in three 6-Roll Horizontal Washers, which will bring the alkalinity of the cloth down to ¼ of 1%. Cloth next goes into a Peroxide Saturator where it is impregnated with a solution of hydrogen peroxide. The cloth now passes through a heater tube and goes on into a J-box where it remains for approximately one hour to allow the cloth to bleach thoroughly. Removed from the J-box, the cloth is given a final wash in two 6-Roll Horizontal Washers.



Butterworth Continuous Bleaching Rope Range (Becco Process)

Cloth is washed in a Tight Rope Washer and given maximum extraction in a pneumatic Squeezer before going into the Caustic Saturator. Here the cloth is impregnated with caustic soda solution. At the delivery end of the machine, two horizontal squeeze rolls with pneumatic pressure device and indicating instrument permit full knowledge of the pressure being applied. Cloth next goes through special interlocking reels and plaitor mechanism and is folded in uniform condition front to back as well as across the width of the J-box. Steaming compartments in the upright sections of the "J" and a small steaming unit in the bottom of the "J" are used according to the amount of goods in the J-box. Leaving the J-box the cloth is washed in a Tight Rope Washer, passed through a Squeezer and timing Scray, a small J-box for holding approximately 25 yards of goods. It then passes through another Tight Rope Washer and a pneumatic Squeezer where the desired extraction is achieved. This is followed by the application of hydrogen peroxide in a Peroxide Saturator. Goods are then passed through a pot-eye and into a J-box; taken through a Tight Rope Washer and Squeezer, thence into a Scray, and then another wash in a Tight Rope Washer and delivered through a Squeezer into the white bins.

This Test Tube Contains



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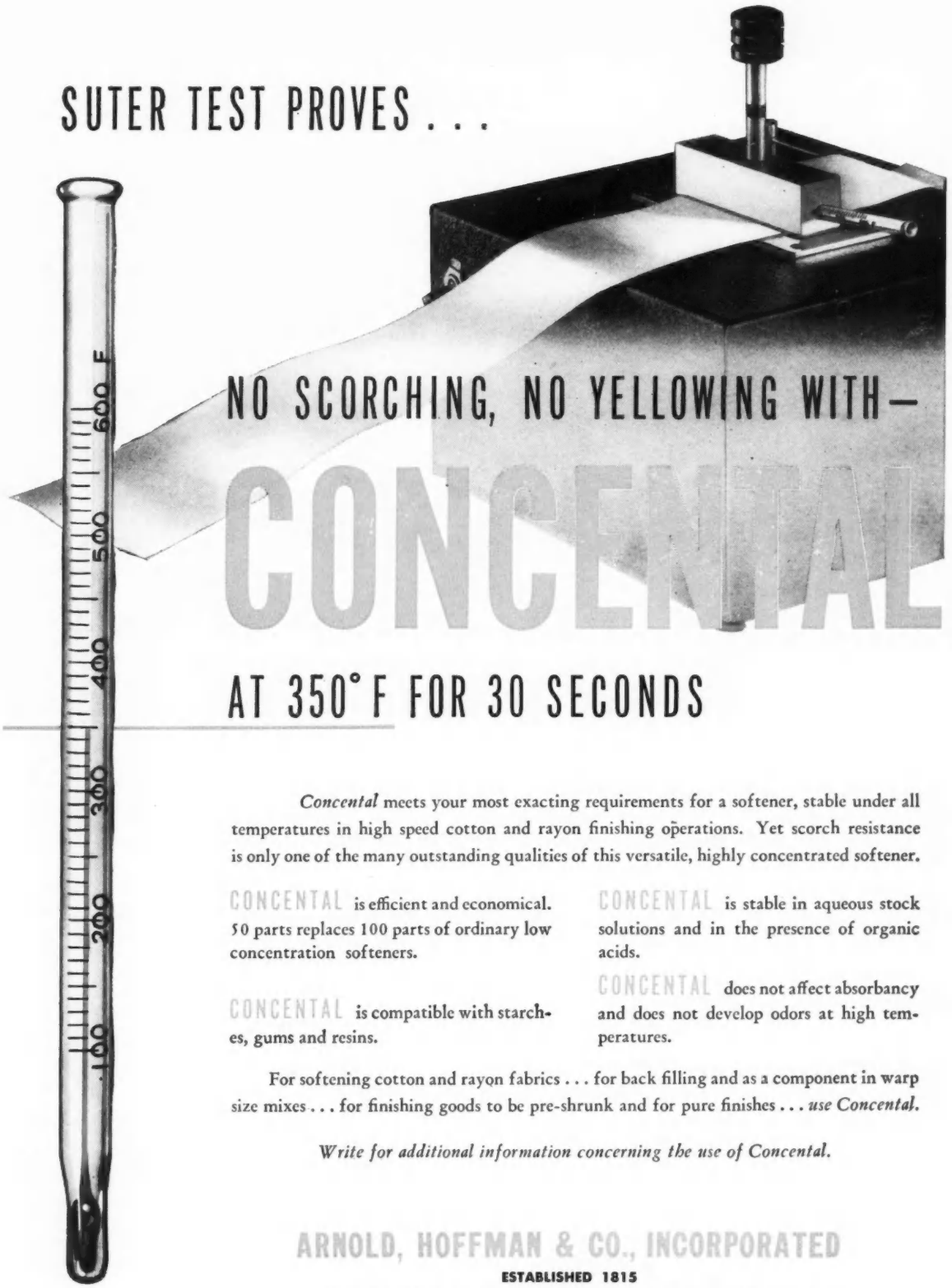

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AT 350° F FOR 30 SECONDS

Concental meets your most exacting requirements for a softener, stable under all temperatures in high speed cotton and rayon finishing operations. Yet scorch resistance is only one of the many outstanding qualities of this versatile, highly concentrated softener.

CONCENTAL is efficient and economical. 50 parts replaces 100 parts of ordinary low concentration softeners.

CONCENTAL is compatible with starches, gums and resins.

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Rainwear must repel rain, but the rainwear that sells *first* is the fabric that's sleek, smart and fashionable. This Celanese-rayon fabric is a fashion-first because of its excellent water repellency, draping quality, softness and color. To make it a buyer's choice, both chemist and dyer worked side by side in selecting and applying proper dyes and water repellent finishes.

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Products of Amalgamated Chemical Corporation include Dyeing Assistants, Fabric Finishes, Scouring Agents and Hosiery Finishes. Amalgamated Field Representatives, experienced technical men, are ready to assist you with any textile chemical problem. Also complete facilities of a modern research and production laboratory are available to you. Build bigger profits through better fabrics. Write, wire or call Amalgamated.

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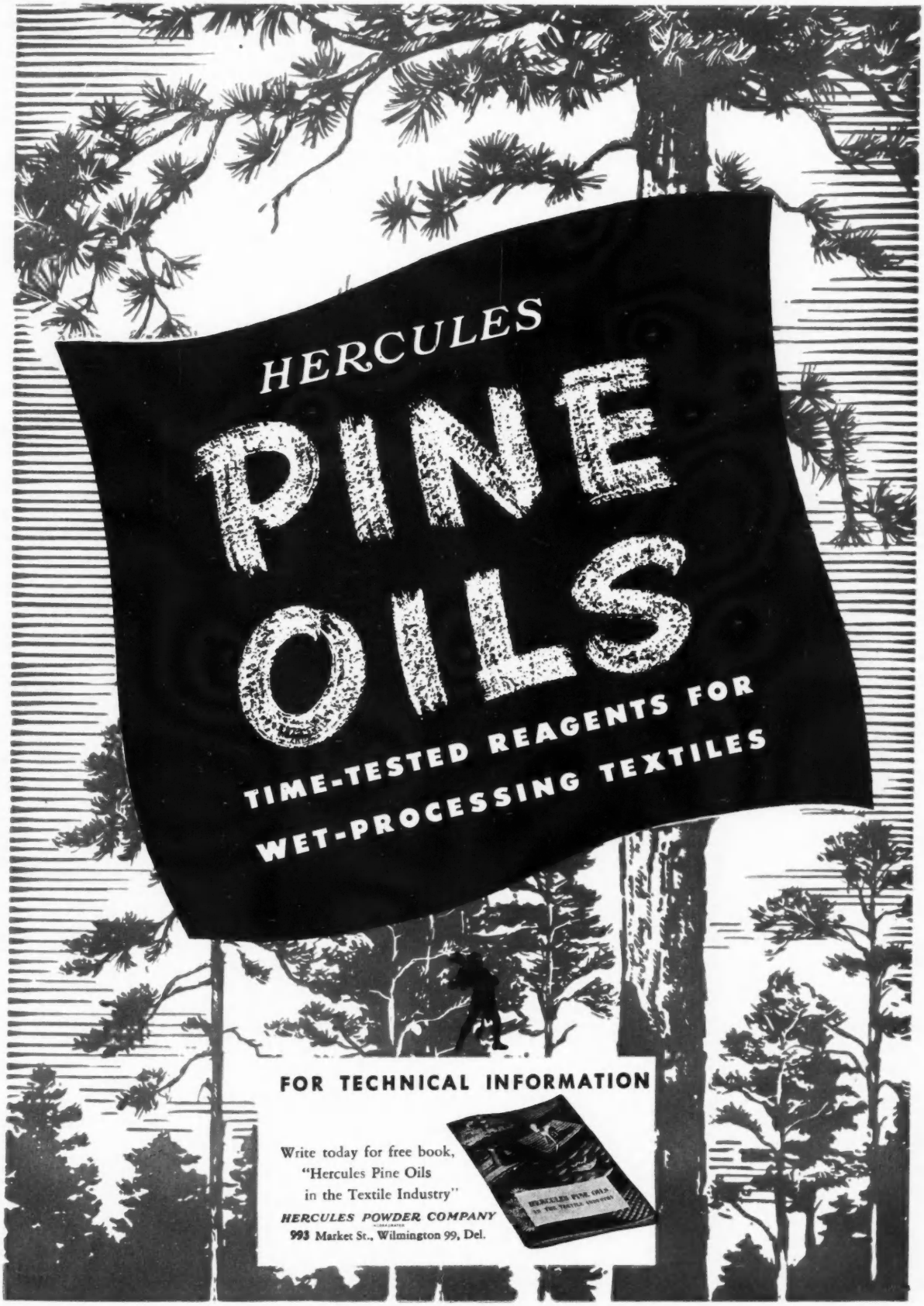
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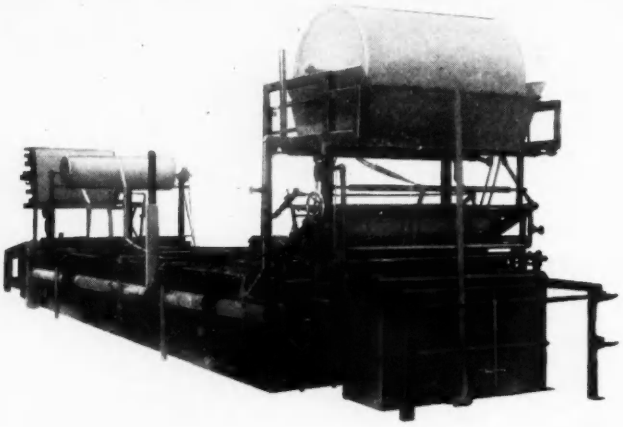
The Evidence

of the worth of any machine to an industry is what those say who own it.



NEW HINNEKENS FLEXIBLE BOIL-OFF

—machine takes cloth continuously in full width, eliminating break marks, stick marks, and other faults inseparable from the use of usual type machines.

Used by 80% of America's dyers, and printers.

The Hinnekens Line of Textile Machines

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WHAT ONE USER SAYS:

"This machine really shrinks the cloth.

"I checked it against another type.

"I found, probably because of the particular design of your machine, the goods shrink up to 50% more, giving a denser fabric.

"Another thing, this is the only machine you can use for plied yarns.

"After all, the boil-off machine is really a setting machine. It sets the cloth for subsequent operations. All the other steps depend on a good boil-off.

"This Hinnekens machine is 'tops' for that job. It gives the quality of the old stick boil-off, with continuous operation.

"It is equally good for all types of clothes: crepes, flat goods, mixtures, acetate and rayon."

ANOTHER USER REMARKED:

"What I like about this machine is that it handles the goods full width. You don't get cracking of the fabrics as you do when you try to handle them in rope form. This machine really sets the goods.

"We use it for Suwanees, Bengalines, Alpaca, Russian Cords, Romaines."

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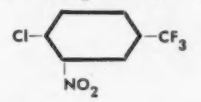
All These in *HOOKER MONOCHLOROBENZENE*

Hooker Monochlorobenzene is serving chemists in many different ways:

1. As a good general solvent, it is especially helpful in the manufacture of paints, varnishes, lacquers and their removers.
2. As an insecticidal intermediate, it is used in the preparation of DDT and other insecticides.
3. As a dyestuff intermediate, it is used in the preparation of sulfur black and brown dyes.
4. As a chemical intermediate, it is used in the manufacture of many organic synthetics, such as picric acid, phenol, dinitrochlorobenzene, drugs and perfumes.
5. As a heat transfer fluid—for condensing vapor systems where glass enameled jackets cannot stand high steam pressure, monochlorobenzene can be used in the range from its boiling point (130° C) up to about 190° C.

Hooker Monochlorobenzene is a clear colorless liquid of high purity. It is a carefully distilled material and after drying with calcium chloride, will distill within 1°C. For more complete physical and chemical information send on your business letterhead for Technical Data Sheet No. 703B.

HOOKER RESEARCH PRESENTS
3-NITRO-4-CHLOROBENZOTRIFLUORIDE
$C_6H_3CF_3$ [3-NO_2,4-Cl]



Molecular Weight	225.56
Freezing Point	−7.5°C
Boiling Point	222°C
Specific Gravity 15.5°/15.5°C	1.542
Refractive Index n20/D	1.491

To its growing list of organic fluorides, Hooker now adds 3-Nitro-4-chlorobenzotrifluoride. It is a thin yellow oily liquid. Indications are that 3-Nitro-4-chlorobenzotrifluoride is a valuable addition to the group of chemical intermediates. It is subject to further ring substitution in the number 5 position. The nitro group may be reduced in alkaline media. The chlorine atom is very stable and unlike other benzotrifluoride compounds, hydrolysis results in attack on the CF_3 group.

Patent literature discloses a variety of applications for nitrochlorobenzotrifluoride in the preparation of azo dyestuffs and pharmaceuticals. At present available in pilot plant quantities, production in commercial quantities can be quickly undertaken when circumstances warrant. Hooker Technical Data Sheet, gives more complete physical and chemical characteristics and literature references. When writing for literature or samples please use your company letterhead.

OTHER HOOKER CHLORO-BENZENES

- Hexachlorobenzene
- Orthodichlorobenzene
- Paradichlorobenzene
- 1,2,4,5-Tetrachlorobenzene
- 1,2,4-Trichlorobenzene

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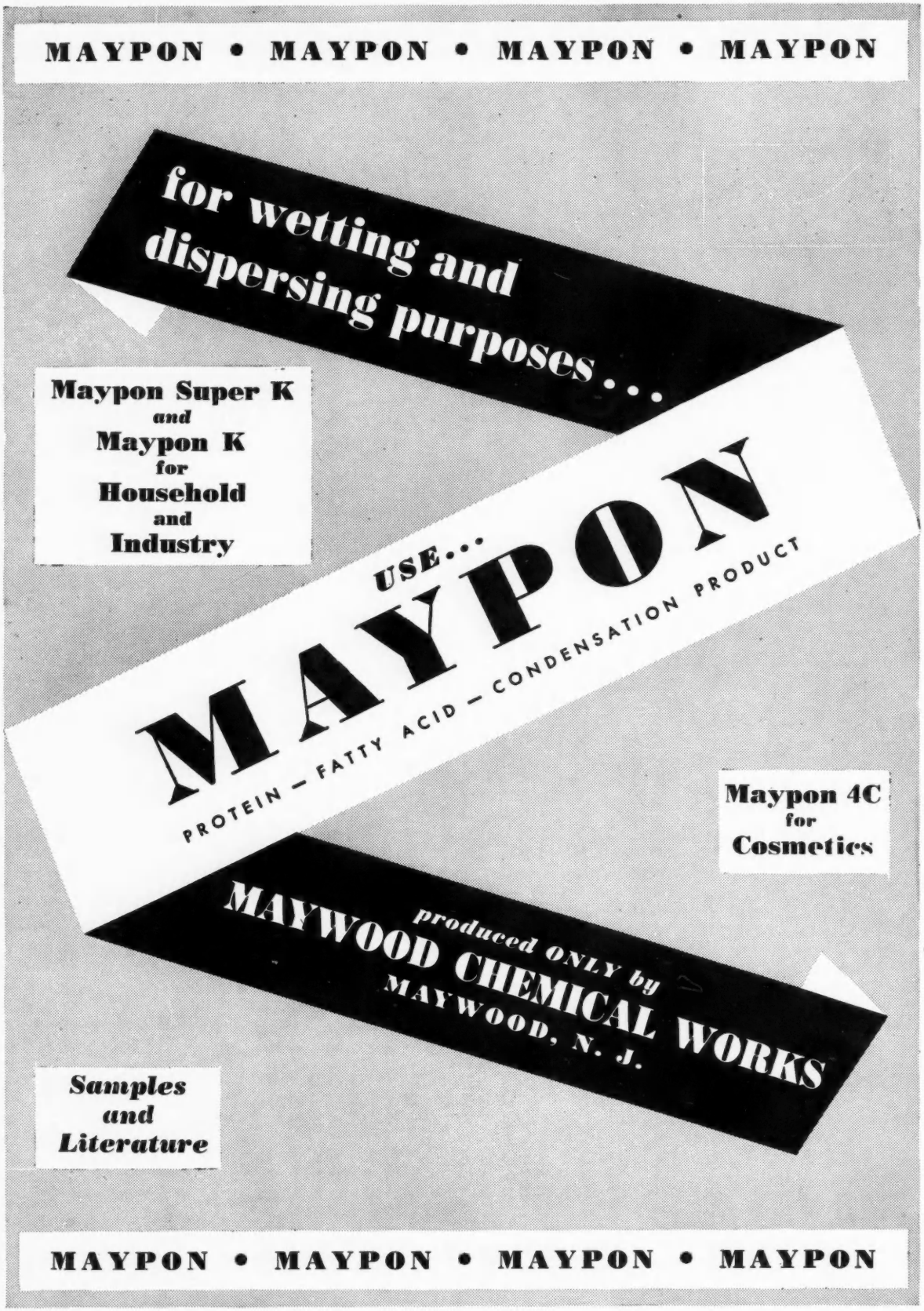
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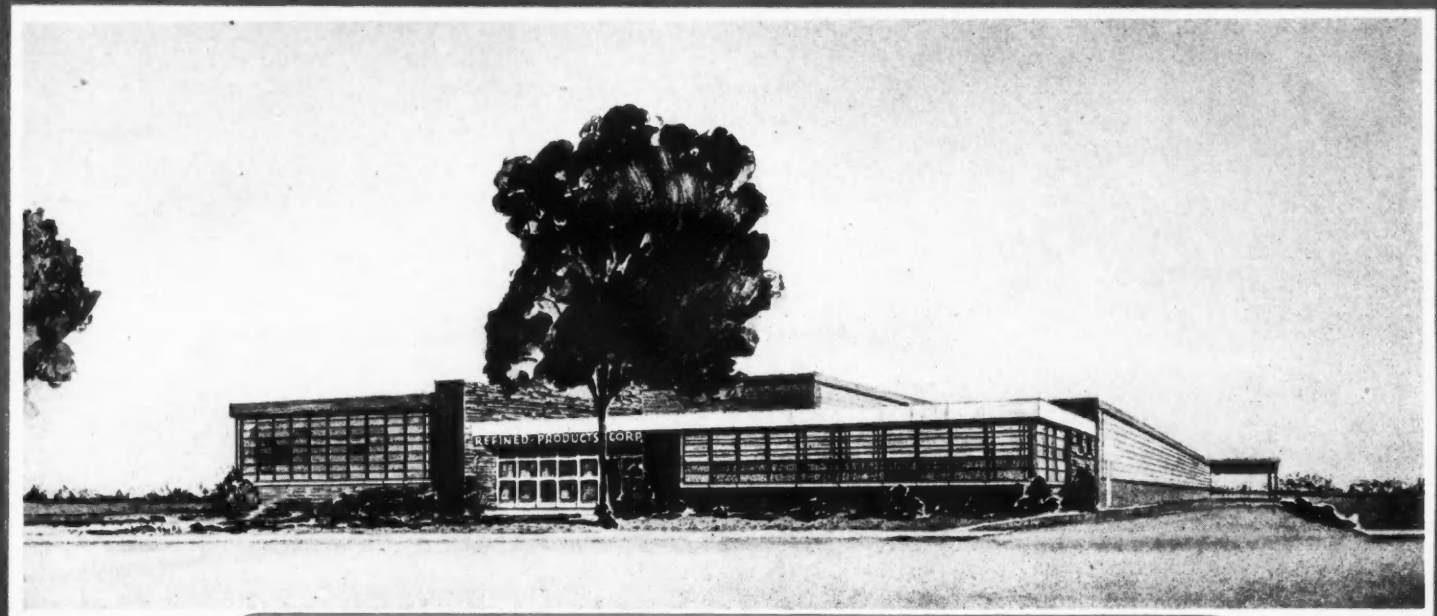

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WHEN you want softness plus body in any textile, investigate STEARO GLYCERYL SULFATE N. It provides notable improvements in softening and plasticizing effects, and at the same time can give you body and/or thickness over a wide range due to its superior penetrating ability.

More readily soluble and more stable because of its higher SO_3 content, Stearo Glyceryl Sulfate N is also more resistant to hard water and electrolytes than conventional soaps and sulfonated tallows. It insures much greater resistance to yellowing and rancidity. It can be used with many other finishes to get a considerable variety of hands.

No changes in process or equipment are involved in using Stearo Glyceryl Sulfate N, and it is much more economical in use than ordinary sulfonated tallows.

Write for Onyx Technical Data Sheet 12-T *for data on Stearo Glyceryl Sulfate N and its use for softening; warp size lubrication; plasticizing starch; as a protective agent against alkali damage, etc.*

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CHEMICALS FOR TEXTILE PROCESSING

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vat fastness
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algosols

for cotton · rayon
mixed fibers
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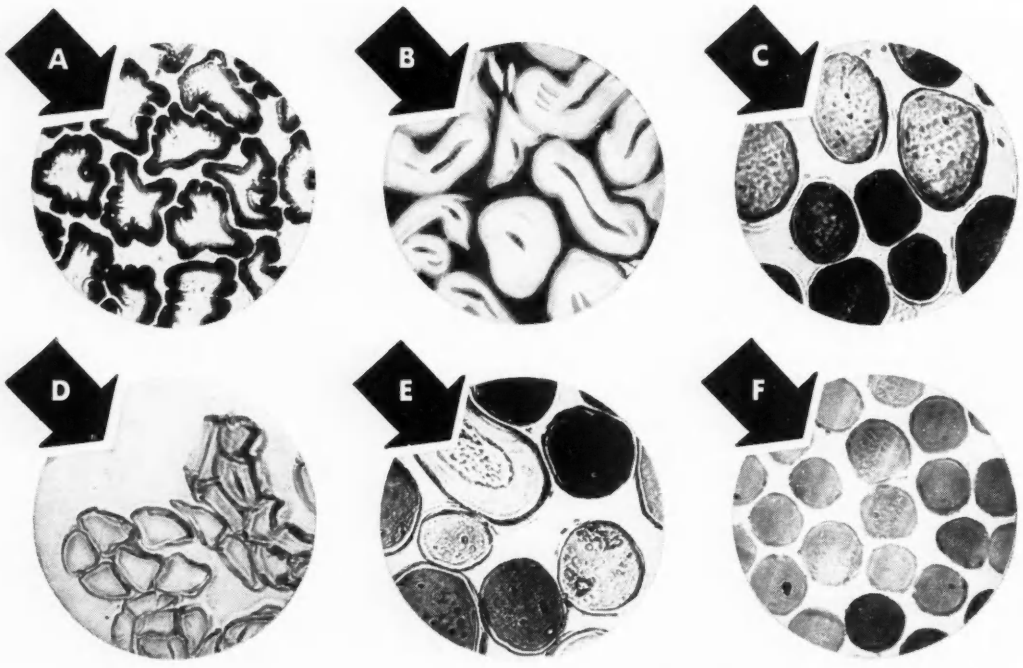
How many of these Fibers can you Identify?



Photomicrograph Courtesy Textile Fiber Atlas

You're an expert if you guessed all six. No matter how many of these fibers you named correctly, they're all vital to Stein Hall. Each of these fibers and many more are continually under the scrutiny of our laboratory technicians.

For 83 years, Stein Hall has serviced the textile industry by developing the finest products for warp sizing, printing, and finishing fabrics made from these and other fibers.

Continuous study...endless testing under expert supervision in controlled laboratories means a more efficient operation in your plant.

Trained salesmen will tell you about Stein Hall textile products. Laboratory specialists will back them up. For a textile problem, call on Stein Hall

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printed with acid, direct and acetate colors on acetate, viscose, wool and pure silk tie goods

Clean-edged printing . . . rich and brilliant colors . . . patterns that are sharp and clear – these are the results you aim for when printing tie materials. And these are the qualities of which you are sure when using Keltex as your print paste thickener.

Keltex is the modern algin thickening agent that gives you exact and uniform paste viscosity; assures maximum color penetration, and brings out true, even color values.

Equally effective in machine or screen printing, Keltex can be used on acetate, viscose, wool and pure silk tie goods. It gives excellent results with direct, acetate and acid dyes or with discharge.

Because it is entirely free of grit or cellulose, Keltex requires no straining or filtering to insure against damage to rollers and screens. It is readily soluble in cold water; needs no cooking or special treatment, and is easily washed out to give a soft and pliable hand.

Keltex is consistently uniform because it is a definite chemical compound, processed to rigid physical and chemical specifications.

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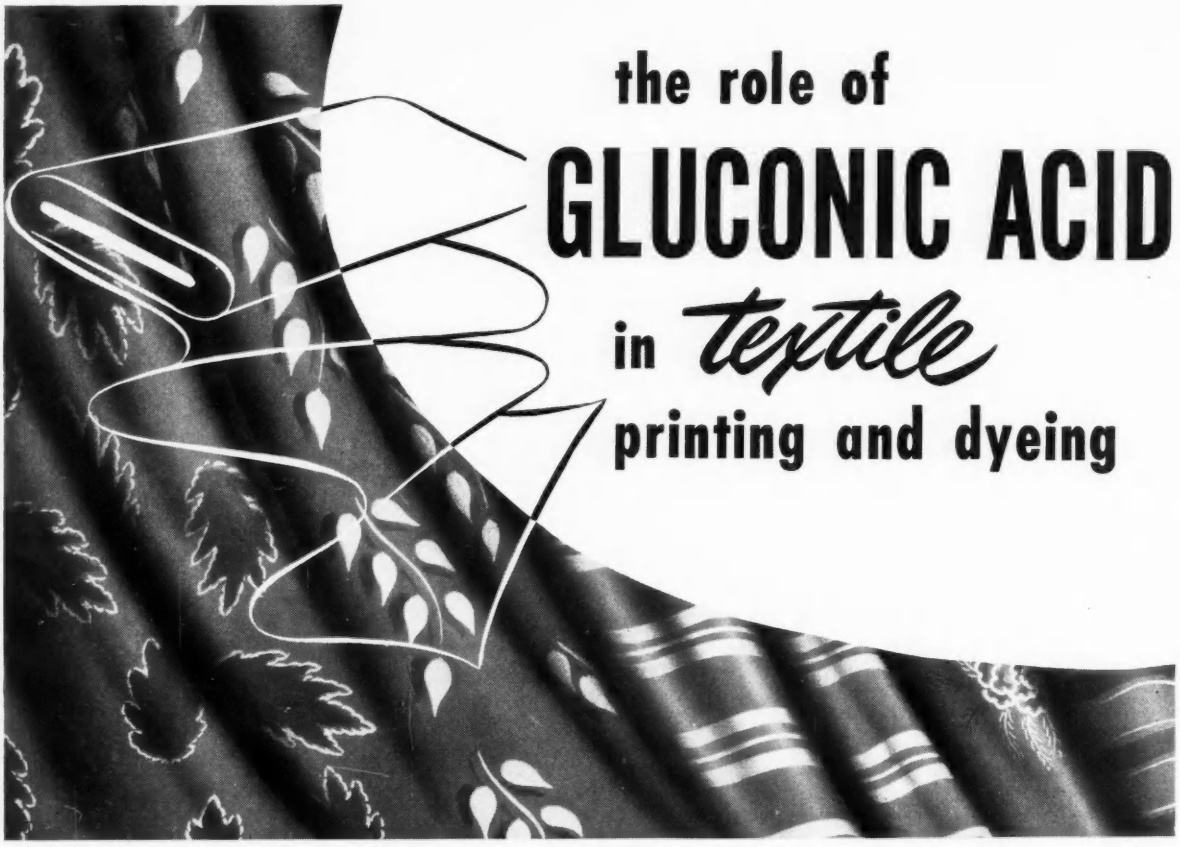

the role of GLUCONIC ACID in *textile* printing and dyeing

Gluconic Acid, as a general-purpose acid, is suited for many roles in various phases of textile printing and dyeing. It is non-toxic. It has no corroding effect. It is economical and easy to handle in most applications and formulations.

One specific purpose fulfilled by this organic sugar acid occurs in developing soluble vat dyestuffs in linen and cotton piece goods by the chlorate acid or neutral steaming process. Here gluconic acid produces an efficient mild acid medium. And, for preparing stable print pastes for screen application and high speed machine work, the acid, upon neutralization with ammonia or ammonia derivatives, becomes an ideal buffer catalyst.

It possesses important metal sequestering and metal complex-forming properties. It combines in solution with such contaminants as iron, copper and aluminum, resulting in clear, sharp, bright colors with many dyes and particularly with soluble vat dyestuffs. Gluconic acid is especially suitable for exhaustion of dye baths, and development, rinsing and souring processes. It is exceptionally mild, non-volatile, considerably less destructive to cloth fibres than stronger acids often encountered.

PFIZER GLUCONIC ACID

is available as a 50% aqueous solution. Ask our Technical Service Staff about applications of Pfizer Gluconic Acid. Or, let us send you a sample. A reprint of a recent article "Gluconic Acid in the Textile Industry" is available on request. Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y.

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CERFAK

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...a development of seven years of research on surface-active agents...with these important characteristics:

An anionic detergent possessing fast wetting speed . . . a pale straw-colored flake-type product . . . not decomposed by either acids or alkalies; may be used over the full pH range; chemically neutral . . . dissolves readily at room temperature. ● CERFAK is an excellent detergent in both soft and hard water . . . can be used with alkaline builders of all types . . . is free rinsing . . . has good dispersing properties . . . superior to soap on a money-value or pound-for-pound basis. For descriptive folder, write E. F. HOUGHTON & CO.

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STEROX 5 and 6 NOW READY FOR TEXTILE MILLS

Non-ionic-type Detergents and Wetting Agents High in Efficiency

PRICED FOR ECONOMY

Polyoxyethylene Thioethers are Efficient Over Wide Ranges of pH and Heat

St. Louis, Mo.—Sterox No. 5 and Sterox No. 6, two highly efficient, non-ionic detergents and wetting agents, are available to the textile and dyeing industries in quantity and at favorable prices, the Phosphate Division of Monsanto Chemical Company, St. Louis, announced today.

These clear, amber-colored detergents and wetting agents are polyoxyethylene thioethers which contain no alkali. They can be compounded with other non-ionic, an-ionic and cat-ionic surface active agents, improving many of the properties of materials to which they are added. Stable over wide ranges of pH and heat, the Steroxes are efficient in solutions that are hot or cold, hard or soft, acid or alkaline. In addition to being effective detergents and wetting agents, Sterox No. 5 and Sterox No. 6 are excellent for dispersion and emulsification.

Supplied in highly concentrated form, without builder salts, it is seldom necessary to use Sterox No. 5 or Sterox No. 6 in concentrations of more than 0.05%. This and the favorable prices make the Monsanto Steroxes economical to use. Being liquids, they are easier to apply with accuracy.

Textile Manufacture

Sterox No. 6 is a rapid wetter and is efficient and economical in any operation that requires a detergent or wetting agent. It is exceptionally good for scouring woolen skeins and piece goods. It is effective as a rewetting agent in Sanforizing and, left as a residue, it makes new towels more absorbent.

Dyeing Processes

Steroxes can be used with great success in dyeing and scouring operations. Being non-ionic, they are compatible with any type of dye bath used. Because of their penetrating ability, the Steroxes speed up dyeing operations and yield thorough, even color.

Data and Samples

Data and samples of Sterox No. 5 and Sterox No. 6 will be sent upon request. Use the coupon, contact the nearest Monsanto Sales Office or write: MONSANTO CHEMICAL COMPANY, Desk C, Phosphate Division, 1779 S. Second Street, St. Louis 4, Mo.

TRY THESE efficient, economical detergents and wetting agents

MAIL COUPON for samples and data

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MONSANTO CHEMICAL COMPANY
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Please send, without cost or obligation:_____Sterox No. 5 data;_____Sterox No. 5 sample;_____Sterox No. 6 data;_____Sterox No. 6 sample.

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A New Product for DYERS and PRINTERS

LOMAR PW the new dispersing agent developed by Jacques Wolf & Co., assures more efficient and economical processing.

• *In Dyeing*

Level shades and uniform absorption of dyestuffs by the fibres, depend largely upon an even dispersion of colors in the dyebath. The addition of a small amount of LOMAR PW in pasting up indanthrenes or acetates solves this problem.

• *In Printing*

When added to the printing paste, LOMAR gives finer particle suspension, improved flow and smoother consistency. By keeping the colors in suspension, LOMAR PW assures efficient, economical results.

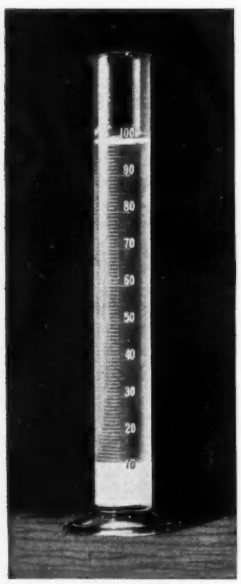
• *In Backfilling*

In backfilling, LOMAR PW is added to the heavy backfill mixture of clay and starches to give uniform suspension of the clay, good flowing properties and more uniform results on the fabric.

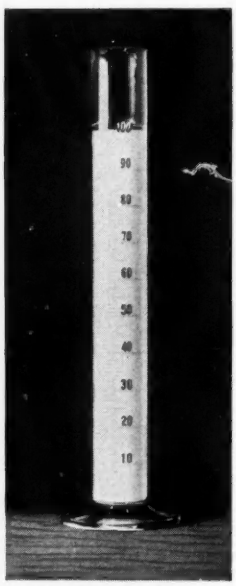
For complete information on LOMAR PW, send today for your copy of Bulletin No. 21.

TYPICAL OF THE DISPERSING ACTION OF LOMAR PW

The contents of these two graduates are identical, except for a small percentage of LOMAR PW. Note the continued even suspension and dispersion in the right hand graduate after standing ten times as long as the one at the left.



Blanc Fixe after 30 minutes — no dispersing agent



Blanc Fixe after 5 hours — plus LOMAR PW

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Sulframin E Liquid also offers you unusual wetting and penetrating powers—even in the presence of hard water, acids or alkalis.

Your cost, based on the percentage of active organic material, is extremely low. Moreover, Sulframin E Liquid reaches you ready to use, thus saving both your time and labor.

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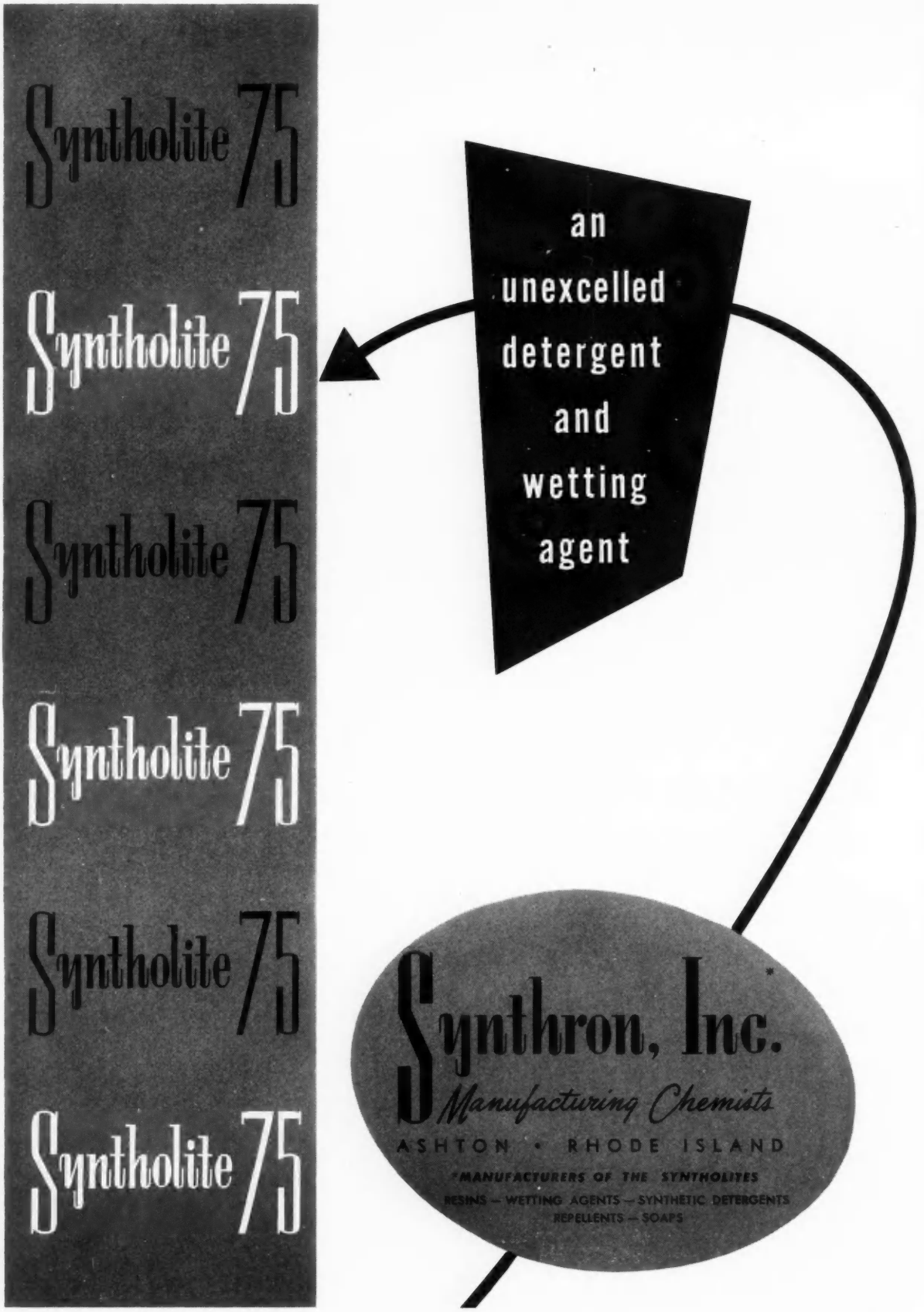
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EASTONE SCARLET BG

Eastone Scarlet BG, a dyestuff with exceptional stability to heat, levels well at either high or low temperatures. It dyes cellulose acetate yarn clear bright shades of scarlet, and nylon clear neutral shades of red. It is satisfactorily used both in combination with other dyestuffs and as a self-shade.

General commercial fastness properties of Eastone Scarlet BG are good, and dyed shades of this color have excellent resistance to atmospheric fading. Its fastness to subliming recommends Eastone Scarlet BG for application printing. It is suitable for either jig or box dyeing, and the color can be stripped from dyed pieces.

Eastman Acetate Dyestuffs are available in a wide variety of colors especially developed for cellulose acetate yarn. For information on these dyestuffs, write to Tennessee Eastman Corporation (Subsidiary of Eastman Kodak Company), Kingsport, Tennessee.

Eastman Acetate Dyestuffs

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ndian Art Textile Mill, a well-known textile rinter in Bombay, India, utilizes Aridye® Pigment olors for printing a variety of cotton fabrics. The pat-ern illustrated is typical of those employed for otton saris.

he formulas used by Indian Art for this particular olor combination were as follows: Blue—Aridye lue FC2G cut 1:15 with Aridye Clear 6214: reen—5 parts Aridye Green FJB and 1 part ridye Yellow FY2G cut 1:15 with Aridye lear 6214. The fabric was roller printed in the sual manner, dried and heat treated to rovide maximum fastness to washing. No ging, soaping, washing or other aftertreat-ent was necessary.

ecause of their ease of application and umerous other advantages, Aridye Pigment olors are being used increasingly by rogressive textile printers 'round the world. n Interchemical technical representative vill be glad to discuss the many ways in which hey will be of benefit to *you*. For full details, rite to Interchemical Corporation, Textile Colors ivision—Pioneers in Pigment Colors for extiles—Box 357, Fair Lawn, N. J.

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TEXTILE CHEMICALS

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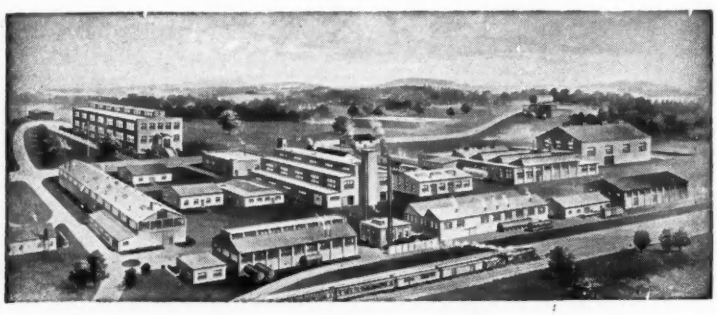
FOR

WOOL — COTTON — RAYON — ACETATE
AND MIXED FIBERS



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Does your manufacturing process require . . .

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Swift's Animal Protein Colloid is made by an exclusive Swift process. Protein liquor is extracted from bones and highly concentrated. This pure liquid falls on a bed of dry finished product which adheres evenly to the droplets. Then, by continuous and automatic schedule, these droplets travel through driers and are milled and screened. This whole operation is under *precise synchronized control* and is completed in relatively short time.

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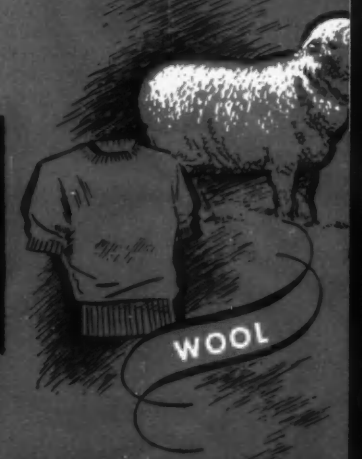
NONIC* 218

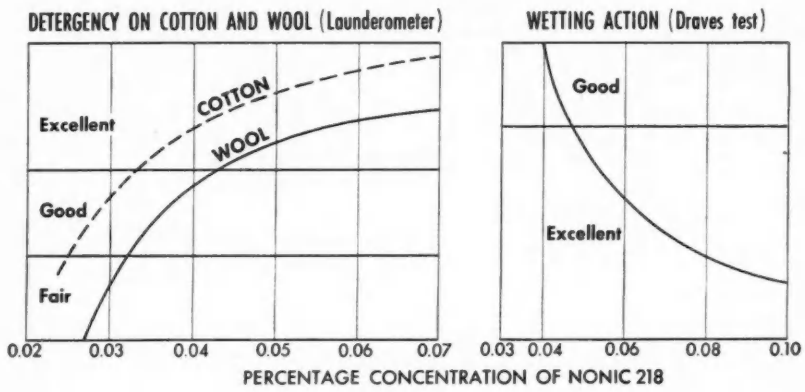
Combines in one Product

- **A high degree of detergency**
- **Extremely fast wetting action**
- **Excellent properties of dispersion and emulsification**



NONIC 218 is an excellent detergent and wetting agent at low concentrations (under 0.05%) over wide ranges of pH, water hardness and temperature. It is unusual for a *single* product to demonstrate these and other important surface active properties to such a high degree of efficiency.

THESE CURVES SPEAK FOR THEMSELVES



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Laurel Boil-Off Oils and Compounds for more effective degumming of pure silk, rayon and cotton mixtures.

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Laurel Rayon Oils for faster, softer yarns, improved appearance and hand of your rayon.

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Laurel Textile Oil, a favorite of hundreds of customers because of its unusual versatility for improved quality and finish of fiber and fabric.

Laurel Wool Oils for maximum lubrication.

Laurel Wool Scouring Compounds for speedier detergent action, clearer, more even dyeings, cleaner, softer, loftier wool.

Laurel Special Finishes, Water Repellents, Mildewproofing and Flameproofing Compounds.

Yes, no matter what fiber or combination of fibers you are using, you will find there's a Laurel Product that will give you exactly the finish you desire.

For over thirty-nine years Laurel has been meeting successfully myriad challenges of leading dyers, bleachers and finishers. From this reservoir of experience and service has come the long line of Laurel processing agents to give you better, more efficient processing for every dollar you spend.

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soaps, oils, finishes

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Contents

Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library

• Special Articles

Testing Apparatus for the Evaluation of Fire-Resistant Textiles 201
B. C. Rowley and M. Sonnino

• Departments

Patent Digest 204
Paul Wengraf
Abstracts 207
Textile Colorist and Converter Section..... 241
Trade Notes—New Products..... 249

• Proceedings of the American Association of Textile Chemists and Colorists

Northern New England Section to Meet March 18th.P210
Rhode Island Section to Meet March 25th.....P210
Committee for National Convention.....P210
Meeting, Philadelphia Section.....P210
Winter Meeting, Piedmont Section.....P210
157 General Research Committee Meeting.....P211
Calendar P212
Intersectional Contest
Stability of Vat Colors at Elevated Temperatures.P213
Piedmont Section
Meeting, North Carolina State College Student Chapter P231
Research Highlights P231
Membership Applications P231, P239
South Central Section
Naphthol Dyeing and Printing.....P232
R. H. Nuttall
Evaluation of Leveling Agents.....P236
D. H. Gunther
New York Section
A Quality Blend Makes Successful Sales.....P234
J. R. Price
Employment Register P240

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AMERICAN
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VOLUME 38 MARCH 7, 1949 NUMBER 5

TESTING APPARATUS FOR THE EVALUATION OF FIRE-RESISTANT TEXTILES

B. C. ROWLEY and M. SONNINO
American Cyanamid Co. Stamford Laboratories

Introduction

The war and recent legislation have given tremendous impetus to work on the development of processes for flameproofing and reducing the flammability of textile fabrics, as witnessed by the large number of recent publications on these subjects. During the course of this and earlier work there have been devised a variety of methods for testing the effectiveness of these processes *(1)*. In general, the directions for testing the fire resistance of a treated textile specify the exposure conditions but, in contrast to the AATCC proposed test of flammability *(2)*, do not indicate the mechanical means by which these conditions are to be produced. Such a situation is prone to lead to the failure of different laboratories to obtain strictly comparable test results even when presumably employing the same testing procedure.

It was felt at the several laboratories of the American Cyanamid Company working on the fire resistance of textiles that it would be desirable to construct an apparatus in which these tests could be carried out conveniently and reproducibly. Thus, test results should be capable of duplication in any of the company's laboratories. The design of such an apparatus and some representative results obtained with it are described below.*

The apparatus was to consist in essence of equipment for assuring proper exposure conditions—that is, for automatically giving standard sample location, standard flame height and duration, and proper shielding. An apparatus approaching this ideal in some respects had been made

* At the present time cooperative tests are being conducted with the American Association of Textile Chemists and Colorists in comparing reproducibility of operation and results of this apparatus with the latest AATCC unit for the evaluation of fire resistant textiles as described on page 130 of the 1947-48 Year Book of the AATCC.

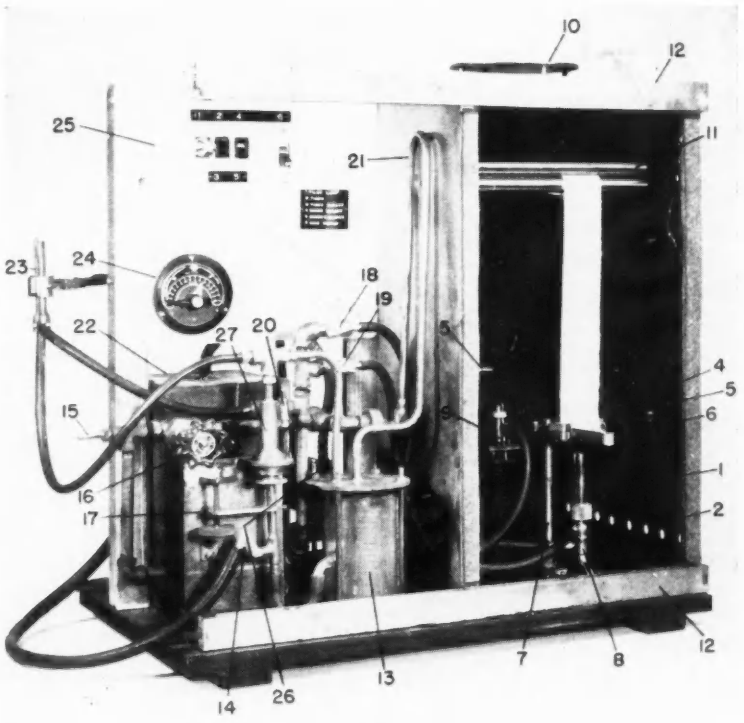

Figure 1
Apparatus for Testing Fire-Resistant Textiles
Sample in Position for Vertical Test

1. Stainless steel cabinet.
2. Air inlets.
3. Sliding glass door.
4. Built-in supports for supporting frame.
5. Flame height indicators.
6. Spring clamp device.
7. Support for spring clamp device.
8. Bunsen burner and pilot.
9. Microburner and pilot.
10. Vent.
11. Rollers for vertical test sample.
12. Tracks for sliding glass door.
13. Bubble tank.
14. Vented Saran tube and water outlet.
15. Gas inlet.
16. Globe throttling valve.
17. Liquid level regulator.
18. Needle valve for Microburner pilot light.
19. Needle valve for Bunsen burner pilot light.
20. Needle valve for exhaust burner pilot light.
21. High leg.
22. Buffer tank.
23. Exhaust burner and pilot.
24. Timer.
25. Manometer.
26. Solenoid valve.
27. Stuffing box.

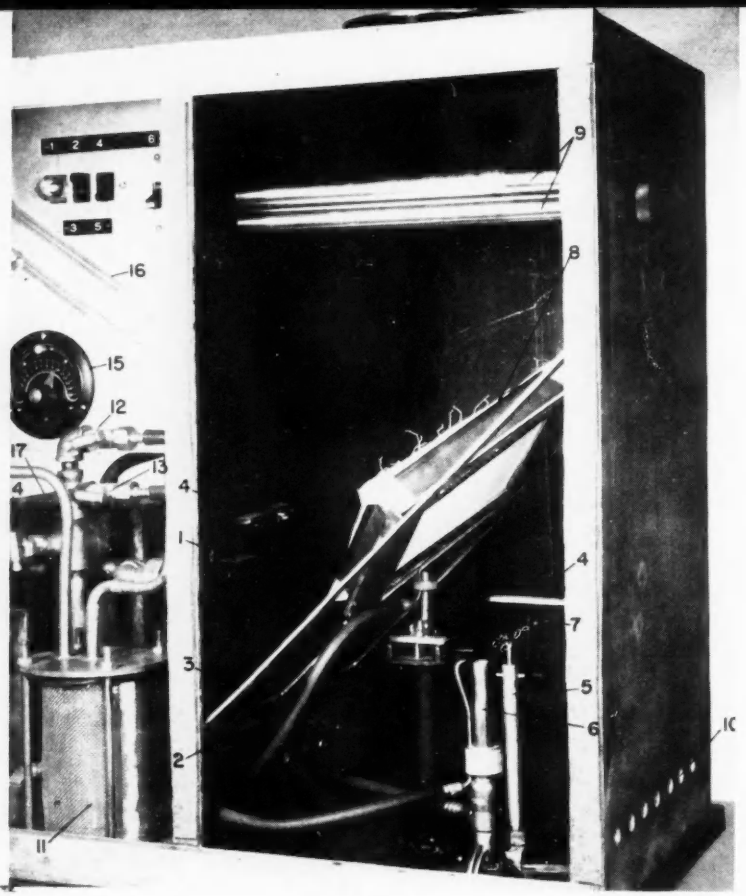

Figure 2
Apparatus for Testing Fire-Resistant Textiles
Sample in Position for 45° Test

1. Built-in support for supporting frame (horizontal test).
2. Built-in support for supporting frame (45° test).
3. Supporting frame for 45° test.
4. Flame height indicators.
5. Support for spring clamp device.
6. Bunsen burner and pilot light.
7. Microburner and pilot light.
8. Spring sample holder.
9. Rollers for vertical test sample.
10. Air inlets.
11. Bubble tank.
12. Needle valve for Microburner pilot light.
13. Needle valve for Bunsen burner pilot light.
14. Needle valve for exhaust burner pilot light.
15. Timer.
16. Manometer.
17. Buffer tank.
18. Water inlet.

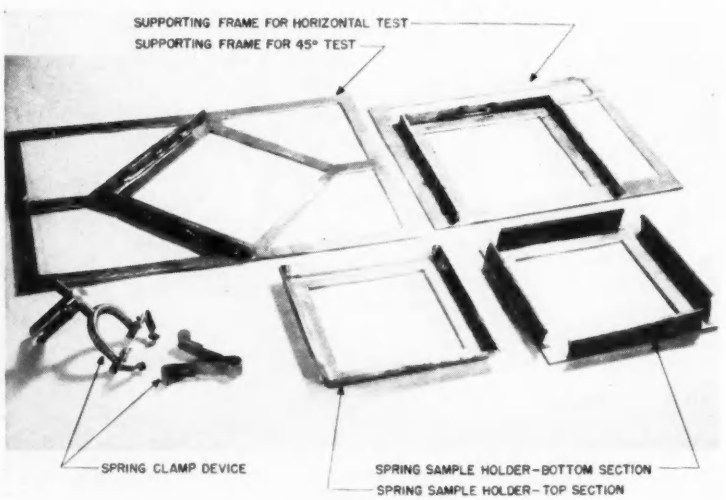
SUPPORTING FRAME FOR HORIZONTAL TEST
SUPPORTING FRAME FOR 45° TEST
SPRING CLAMP DEVICE
SPRING SAMPLE HOLDER–BOTTOM SECTION
SPRING SAMPLE HOLDER–TOP SECTION

Figure 3
Apparatus for Testing Fire-Resistant Textiles
Sample Holders and Supports

and used during the war by a group in the Quartermaster's Corps working at Columbia University under the direction of Captain Robert W. Little *(4)*. It consisted of a cabinet for testing samples in a vertical, horizontal, or 45 degree position, with arrangements for the proper location of the samples over permanently located burners with attached pilot flames. The flame durations were controlled manually by means of plug valves and the flame heights through a clever combination of valves and a gas buffer tank.

Details of Apparatus

The present apparatus is designed to carry out the same three tests, the vertical test being the most widely used *(5)*, *(6)*, *(7)*, *(8)*. The fundamental means of locating samples for the horizontal and 45 degree tests which were used in the "Columbia Test Cabinet" as well as the use of permanently located burners with attached pilot flames have been incorporated in the present apparatus. Considerable improvement in the actual sample holder for the horizontal and 45 degree tests and a new type of holder for the vertical test give increased ease of operation as well as some improvement in reproducibility. The gas pressure is more adequately controlled and little or no adjustment is needed to maintain proper flame heights. Electric timers and solenoid valves are used to control flame duration, leaving the operator free to observe the testing or to make supplementary timings if he so desires. These improvements permit extremely rapid operation without loss of accuracy. It has been found that in routine work a skilled operator can perform vertical tests on more than 60 samples in an hour and can run the horizontal and 45 degree tests about twice as rapidly for samples that do not afterflame. For the vertical test the standard deviation in char length for 10 replicate tests has been found normally to be less than ¼ inch although there have been a few exceptions.

The present apparatus is shown in Figures 1 and 2. The tests are performed in a 12" x 12" x 24" cabinet provided with a vent at the top and air inlets at the bottom. The open front, through which samples are put into position, is covered during operation with a sliding glass door which permits observation of the tests.

Figures 3 and 4 show the sample holders and supporting frames. When the 8½" x 8½" samples for the horizontal or 45 degree test are laid across the inverted top section of the spring sample holder and the bottom pressed into place, the cloth is held firmly on all four sides under a slight and (for the same fabric) reproducible tension. The sample holder is then placed on one of the supporting

frames, which when in position on the built-in supports in the cabinet, automatically places the sample in standard position for testing. Figure 2 shows a sample in position for 45° test. The 13" x 2" samples for the vertical test are held at the bottom corners by the spring clamping device and at the top by rollers built into the cabinet. When the cloth is lined up in the clamping device and the clamp placed on its support, the bottom edge of the cloth is centered over the burner at the standard height for testing. Vertical slack is taken up by turning the rolls. A cloth in position for the vertical test is shown in Figure 1.

A flow diagram of the gas system is given in Figure 5. Various combinations of the present control apparatus have been tried for regulating the gas pressure so that the flame heights would be satisfactorily constant. The gasometer was omitted in some of the tests, in others the bubble tank was by-passed and both of them were by-passed in still other tests, but the combination shown yielded by far the best results. The Bunsen burner for the vertical test is used with a completely luminous flame, the height of which can be regulated by means of the needle valve at the base of the burner. For the horizontal and 45 degree tests the microburner is used with a luminous-tipped flame. Its height is directly dependent on the gas pressure, which is regulated by adjusting the height of the vented water exit from the bubble tank, through which a slow stream of water flows continuously.

The presence of pilot flames on the burners makes possible the regulation of the flame duration by simply turning the gas on and off. The gas is admitted to each of the two burners through a solenoid operated valve, and both solenoid valves may be connected through a timer, thereby making timing of the test automatic. Two selector switches permit selective operation of either (but not both) of the two burners and give a choice of either controlling the duration of the flame by use of the timer or manually, presumably for regulating purposes. The timer and switches are mounted on an aluminum panel board which may be seen in Figure 1.

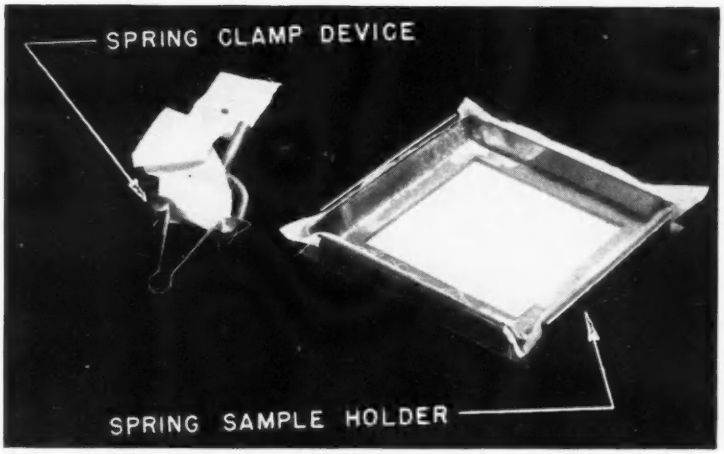

Figure 4
Apparatus for Testing Fire-Resistant Textiles
Sample Holders Assembled

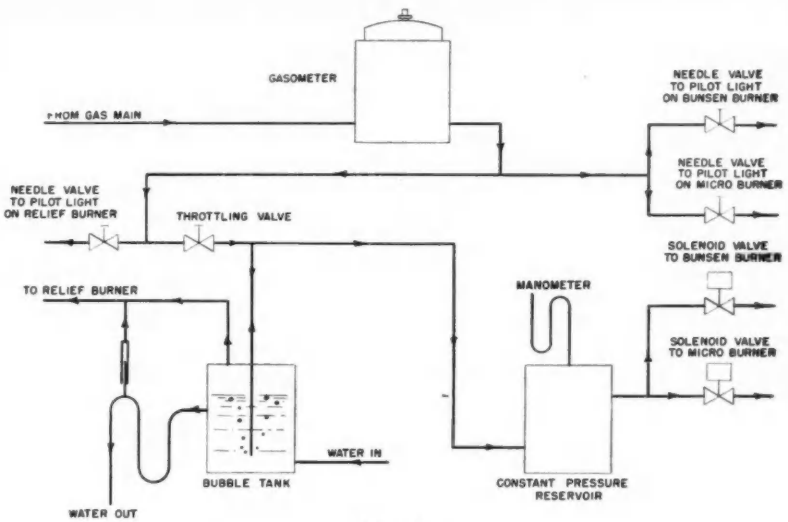

Figure 5
Apparatus for Testing Fire-Resistant Textiles
Flow Diagram

Test Results

An indication of the reproducibility of vertical and horizontal tests made in this apparatus is given by the results in Table I. In obtaining these results the vertical samples were given a 12-second exposure to a 1¾ inch luminous Bunsen burner flame with the bottom edge of the sample 1 inch in the flame and the horizontal samples were given a 12-second exposure to a 1¾ inch luminous tip microburner flame with the sample held 1 inch above the top of the microburner. The tests were made on 80 x 80 cotton treated with three different fire retardants, two durable and one non-durable. Comparison is given of the results obtained when testing of similar samples was carried out independently by two laboratories of this Company each equipped with an apparatus of this type.

Only in two cases, lines 5 and 7, are there real but small statistical differences *(9)* between the results in the two laboratories. However, in view of the fact that errors due to the variation of application inherent in laboratory work are included in the results, the reproducibility of operation of the apparatus is considered quite satisfactory.

It should be pointed out that in this work city gas was used as fuel. While variations in the B.T.U. content of the particular city gases in question were not found large enough to have much effect on the test results, it is obvious that more assurance of reliability could be obtained with tank gas and that this might be found necessary in some localities.

Conclusion

It is felt that in view of the reliability of results and the extreme ease and

TABLE I

Tests of 80 x 80 Cotton Treated With Three Fire Retardants

	Laboratory A				Laboratory B			
	Average Char. in.	No. of Samples	Standard Deviation(1)	Coefficient of Variation %(2)	Average Char. in.	No. of Samples	Standard Deviation(1)	Coefficient of Variation %(2)
VERTICAL TEST								
Durable Fire Retardant "A"								
10 min. rinse (3)	3.5	10	.22	6.4	3.5	10	.23	6.6
1 hr. wash (2)	4.3	10	.21	5.0	4.0	10	.20	5.0
Durable Fire Retardant "B"								
10 min. rinse (3)	2.9	10	.09	3.2	2.7	10	.18	6.6
1 hr. wash (4)	3.3	10	.15	4.5	3.1	10	.35	11.2
5 hr. wash (5)	3.9	9	.41	10.4	4.5	8	.47	10.4
Non-Durable Fire Retardant "C"								
(6)	3.9	20	.35	9.1	3.9	10	.36	9.3
HORIZONTAL TEST								
Non-Durable Fire Retardant "C"								
(7)	2.4	12	.05	2.1	2.2	10	.05	2.2

(1) Standard deviation of replicates $= \sqrt{\frac{\text{Sum (deviations)}^2}{\text{Number of tests}-1}}$

(2) Coefficient of variation $= \frac{\text{Standard deviation}}{\text{Mean of tests}} \times 100$

rapidity of operation, the instrument is of very definite value in testing the effectiveness of fire-resistant textiles. While laboratory test results are not as yet available, the instrument promises to be suitable likewise for the evaluation of flameproofed paper as it conforms to T.A.P.P.I. standard *(3)* and ASTM method D-777.

As is always the case with this type of work numerous useful suggestions and criticisms were received from members of the various divisions of the company. We would particularly like to express our appreciation to J. J. Sanger for his useful ideas in the design of the sample holders as well as his supervision of the actual construction of the apparatus. We would also like to acknowledge the helpful advice received from Drs. J. K. Dixon, R. H. Kienle, and J. E. Lynn, W. F. Caldwell and Miss A. MacMillan. Finally, we are indebted to L. A. Fluck and to M. R. Burnell for the illustrative test results.

References

(1) "Flameproofing Textile Fabrics" by Robert W. Little, Rheinhold Publishing Corporation, 1947.

(2) AATCC Flammability Tester—Tentative Test Method—American Dyestuff Reporter, May 6, 1946.

(3) TAPPI Standard T-461 m-45, Nov. 1945.

(4) NRC Project QMC No. 27—Report—January 1945—"Flame Test Methods and Apparatus for Evaluating the Relative Flameproofness of Treated Cotton Fabrics"—Capt. R. W. Little.

(5) U. S. Army Specifications No. 100-48, May 1945, "Test Methods for Textiles".

(6) Navy Department Specification 24C20, March 1945—"Canvas, Cotton, Fire, Water and Weather-Resistant".

(7) Circular of NBS, C455, August 1946, "Flameproofing of Textiles" by Marjorie W. Sandholzer.

(8) "The Flameproofing of Fabrics" by J. E. Ramsbottom, D.Sc., Ph.D., F.R.Ae.S.—Department of Scieentific and Industrial Research—London, England (1947).

(9) Applied General Statistics by F. E. Croxton and D. T. Cowden, p. 329.

• PATENT DIGEST •

Shrinkproofing Wool—Butadiene Polymers or Copolymers Used A, 2, 04

U. S. Pat. 2,447,538 (Montclair Research Corp., Rust, August 24, 1948)

PAUL WENGRAF

Various processes for shrinkproofing wool have been developed in recent years. Besides the standard chlorination methods (dry chlorine, sulfurylchloride) treatments with alkylated methylolmelamine condensates have been described. Polymerized products of the rubber type have been proposed, for instance, rubber latex in combination with quaternary ammonium bases. The present specification states that some of these processes are apt to endanger the fiber structure, reduce the wearing qualities and give an undesirable hand to the fabrics. According to this patent, wool in any desired form (raw wool, yarn, knitted or woven goods) can be shrinkproofed by applying an aqueous bath containing a butadiene polymer or a co-polymer of butadiene with other unsaturated hydrocarbons. An electrolyte (according to the examples: sodium sulfate) has to be added to allow the deposition of the polymeric butadiene on the wool fibers. The reason for this reaction is not quite understood; it is assumed that the effect is rather due to a reversal of the electrical charge by the strongly hydrolyzed inorganic salt than to a salting-out action in which event the amount of salt used in this process would be insufficient. Straight butadiene polymers have proved to have a superior effect to co-polymers for instance, those obtained by co-polymerizing with methyl methacrylate. Vinyl compounds, however, may be co-polymerized with butadiene to give efficient anti-felting emulsions. In one of the examples, the effect of butadiene and methylmethacrylate polymers was compared. The less butadiene present in the emulsion the more the wool was felted and shrunk in various aftertreatments. An example, dealing with straight butadiene polymers, indicates that the monomer butadiene was buffered at pH = 10, mixed with hydrogen peroxide and emulsified in the presence of an acid resistant agent for instance sodium lauryl sulfate. After reacting this mixture at 45°C. for 17 hours the emulsion was distributed in water, sodium sulfate was added and the bath was heated to 60°C, whereby the emulsion was rapidly deposited on the wool.

(Variations of this method are protected by the same inventor's U. S. Pat. 2,447,539 and 2,447,540.)

References cited by the U. S. Patent Office, among others:

U. S. Pat. 2,343,095 (Du Pont): emulsions of methyl methacrylate polymers or

of different resinous compounds are used for treating textile materials. In contradistinction to the present invention no salt solutions are used and the emulsion is prepared with cation active agents.

U. S. Pat. 2,340,358 (U. S. Rubber): the solution used for impregnating textiles is similar to that described in the present patent insofar as butadiene polymers are applied. The difference is in that the resin dispersion contains macroscopic already agglomerated particles which adhere on contact to the fabric.

U. S. Pat. 2,232,515 (Du Pont): emulsions of butadiene methylmethacrylate polymers are described and recommended for all kinds of laminating or impregnating, softening and general textile auxiliary agents. Wool shrinkage control is not particularly mentioned in the specification.

Other reference:

U. S. Pat. 2,406,958 (see AMERICAN DYESTUFF REPORTER, 1947, 37): proposes shrinkproofing wool with unsaturated hydrocarbons such as styrene.

Rotproofing Textiles—Metal Salts of Cellulose Glycollic Acid G, 1

U. S. Pat. 2,448,153 (Secretary of Agriculture, Reid-Daul, August 31, 1948)

The patent is based on the well known reaction between alkali cellulose and chloroacetic acid: cellulose glycollic acid (also termed carboxymethyl cellulose or CMC) plus NaCl are formed. This reaction has first been patented by Deutsche Celluloid Ges. (Ger. P. 332,203/1921). The metal salts of the cellulose glycollic acid are insoluble in water, thus giving a water repellent finish. Even without reacting this compound with a metal salt, water repellency is the result of the increased swelling properties of the modified cellulose. The inventors disclose "that the cloth, due to swelling of the yarns, becomes leakproof when wet and therefore may be used as a waterproof wall." This surprising effect is probably caused by a relatively high percentage of carboxymethylcellulose formed. The main claim mentions a treatment with a 20-50 per cent alkali lye, resulting in a product carrying *one carboxymethyl* substituent to 40—5 glucose units. The most important feature of the patented process is obviously the rotproofing effect, obtained by reacting these high carboxyl-substituted celluloses with salts of Cu, Fe, Ag, Ni, Hg, Pb and Al. Samples of skeins treated first with alkali, thereupon with monochloracetic acid, finally with one of the metal salt solutions, were subjected to the action of micro-organisms in the water of Bayou, Louisiana, and to severe soil burial tests. The effect of a copper after-treatment according to the present method was much superior to that of copper naphthenates. Mercury salt aftertreatments preserved the tensile strength of yarns as long as 7.5 weeks in the soil burial test.

References, cited by the Patent Office, among others:

U. S. Pat. 1,736,714 (Lilienfeld): relates to a treatment of caustic, followed by reacting the fabric or yarns with monochloroacetic acid. The description of the effect is very confused. Probably mainly an increase of luster is intended.

U. S. Pat. 2,225,589 (I. G. Farben): cellulosic textiles are reacted with inner anhydrides of higher fatty acids to render the fibers water repellent; this effect can be increased by a metal salt aftertreatment.

Other references:

British Pat. 572,868 (Oel & Chemie Werke): describes the way of preparing cellulose glycollic acid from alkali cellulose and monochloroacetic acid in a salt free state. (See REPORTER, 1946, 337.)

German Pat. 748,632 (A. Th. Boehme, Schrodt): cellulose glycollates as lubricating agents. (See REPORTER, 1946, 459.)

U. S. Pat. 2,420,949 (Rohm & Haas): zirconium salts of cellulose-glycollic acid as water repellents. (See REPORTER, 1947, 644.)

British Pat. 588,294 (French & Sons) and 590,599 (Scapa Dryers): describe rotproofing textiles with metal oxides. (See REPORTER, 1948, 136.)

Cellulose Solutions—Oxidation With Nitrogen Dioxide and Solution in Alkalies G, 2, 01

U. S. Pat. 2,448,892 (Eastman Kodak, Kenyon-Yackel, September 7, 1948)

The inventors enumerate many publications relating to treatments of cellulose with nitrogen dioxide NO_2, which is, generally speaking, at room temperature a mixture of the monomer NO_2 with the dimer N_2O_4. Most of the former processes had the purpose either to promote acetylation of cellulose by the catalytical action of nitrogen dioxide or to prepare mixed nitro acetyl esters or finally to find a new way of nitrating cellulose. The earlier U. S. Pat. 2,232,990 of the same inventors had quite another objective. It has been found that pure oxidized (nitrogen-free) celluloses can be obtained by a treatment of cellulose with gaseous or vaporous nitrogen dioxide. The effect is the transformation of hydroxy groups, linked to the carbon atoms in the glucose units, into carboxy groups. The present invention tends to simplify the older method by using solutions of NO_2 in carbon tetrachloride or other chlorinated hydrocarbons. Solutions used in this process can either be prepared by merely mixing the liquid nitrogen dioxide (boiling point 20°C.) with carbon tetrachloride or by bubbling NO_2 vapors through the chlorinated hydrocarbon. One of the examples describes dipping cotton into a solution of 3 p.b.w. liquid NO_2 in 200 p.b.w. carbon tetrachloride. The carboxyl content of the cellulose was about 7.2 per cent after 60 hours' immersion (the carboxyl group determination was carried out according to one of two methods, developed by the authors and published in *J. Am. Chem. Soc.*, 1942, 121). It can generally be stated that the more energetic the action and the higher the concentration of NO_2 in the treating liquid the greater becomes the increase on carboxy groups. One of the most remarkable effects in this series of inventions is the result that oxidized (i.e. carboxylized) cellulose becomes soluble in 2 per cent alkalies when more than 13 per cent carboxy groups are present. This property can very possibly be used for obtaining permanent finishes, sizing effects or the like while this specification just mentions that the alkali soluble compounds as well as the alkali-insoluble products (carboxy group content 5-9 per cent) have both their specific applications.

References cited by the U. S. Patent Office, among others (besides those mentioned in the preamble of the specification):

U. S. Pat. 2,246,391/41 (Eastman Kodak): oxidized cellulose of the type protected by the present patent is obtained by a treatment with liquid NO_2, containing 5-15 per cent nitric acid which has practically no nitrating effect; less than 1 per cent nitro products result.

For some other references see abstract to U. S. Pat. 2,423,707 (Eastman Kodak, Kenyon-Unruh). (REPORTER, 1947, 666.)

Glass Fibers—Printing with Water-in-Oil Emulsions D2, 07

U. S. Pat. 2,450,902 (Interchemical Corp., Marberg, October 12, 1948)

This patent refers to former attempts in dyeing or printing textiles made from glass fibers. Obviously the standard dyeing or printing procedures, used in processing swellable fibers, cannot be used for the non-adsorptive glass fibers. Former methods consisted of incorporating mordants in the glass mass and dyeing these mordants thereafter. Coating with pigmented lacquers was proposed, too. But these methods were not satisfactory. The mordant dyes were easily removed while the lacquers gave an undesirable harsh "hand", i.e., stiffness to the textile fabrics. Moreover they were neither fast to washing nor to dry cleaning. The present pat-

ent suggests applying pastes of the water-in-oil type as described in one of the "Aridye" patents (U. S. Pat. 2,222,581/1940, Jenett). The formula indicated in this patent has been adapted and modified in such a way that the lacquers adhere firmly to the glass fibers; the lacquer phase contains a formaldehyde urea (or melamine, guanidine and the like) condensate, which must be soluble in organic solvents plus a vinyl chloride-vinyl acetate polymer. The aqueous phase consists of a dyestuff pigment such as a copper phthalocyanine, India Red and so on, slurried with water. In an example "Vinylite VYHH," an interpolymer of 87 p. vinyl chloride and 13 p. vinyl acetate, is dissolved in an organic solvent and a urea-formaldehyde condensate, dissolved in "Solvesso No. 2" is added. The aqueous phase comprises 80 gm. of a 20 per cent Phthalocyanine Green paste and 256 gm. water. The emulsion is passed through a colloid mill. This paste is printed on a glass fiber fabric and the resin is set by heating to 300°F. for 5 minutes. The prints are wash-fast and fast to dry cleaning.

Reference cited by the U. S. Patent Office, among others:

U. S. Pat. 1,935,577 (Carbide and Carbon): describing the first time the resins, formed from joint polymers of vinyl acetate and vinyl chloride, being new individuals and differing in their properties from polymers, consisting of one of the single components.

See also abstract to U. S. Pat. 2,428,302 (Owens Corning Fiberglass): (REPORTER, 1948, 383) wherein different coating methods for glass fibers are mentioned.

Printing Vat Dyestuffs—Stabilized by Quinonylamides of Dicarboxylic Acids and Urea D, 2, 01

U. S. Pat. 2,451,270 (American Cyanamid Co., Amick-Kienle, October 12, 1948)

Vat dye assistants must be added either to the dyestuff pastes (for instance to the filter cake) or to the ready-made printing paste in order to give good printing results. Adding these ingredients during the dyestuff manufacture is generally preferred, but recently more and more vat dyestuffs in powder form have been available to the trade. For this type of dyestuff only assistants in solid form can be used. The otherwise very efficient alkylolamines (ethanolamine) are excluded, as well as polyalcohols (glycerine). Some of the solid assistants such as "silver salt" (sodium anthraquinone beta sulfonate) give only a poor effect. Anyhow, none of these assistants is able to prevent deterioration of the paste in standing. Thus an assistant effective in improving permanently the color yield was still lacking. The present patent claims to solve the problem by the combined use of dicarboxylic acid amides of quinone derivatives and urea or urea derivatives. The general formula for the first part in this composition is: QU—NH—CO—Acid group—CO—NH—QU (wherein QU = quinonyl group). Dicarboxylic acids used in this process are lower members of this group, up to C = 8, for instance maleic, fumaric, or phthalic acids. The second part of the composition is urea, also alkyl urea or phenyl urea, preferably pasted with dextrine ("colloidized"). Whether the urea component and the quinonyl component undergo a reaction with one another is not quite certain. An example mentions the manufacture of a presscake of Orange R (Colour Index 1217) to which a suspension of anthraquinonylmono amide or maleic acid plus urea are added and mixed with an alkaline thickener containing Hydrosulfite NF. Another analogous paste was prepared but urea was omitted. The paste containing urea gave better printing results than the paste to which the quinonylamide, but no urea, was added.

References cited by the Patent Office, among others:

U. S. Pat. 2,286,262 (Allied Chem.): vat dyes are pasted with polyamines such as triethylene tetramine.

U. S. Pat. 2,233,101 (National Aniline): describes a vat dyestuff paste, consisting of dyestuff, dispersing agent and dibutyl sodium sulfosuccinate.

U. S. Pat. 2,196,958 (American Cyanamid): printing compositions from vat dyestuffs, potash and thickener mixed and dried under reduced pressure.

Reference is made to U. S. Pat. 2,405,151 (American Cyanamid — same inventors): abstracted in REPORTER, 1947, 37. It is proposed in this patent to use anthraquinone derivatives for improving vat printing pastes. The combination of anthraquinone derivatives with urea was not mentioned in this patent.

Printing Lustrous Patterns on Dull Ground D, 1

Brit. Pat. 597,435 (Cranston Print Works, January 26, 1948)

A partial glazing effect results by printing a fabric with a (colored or white pigmented or non-colored) melamine formaldehyde precondensate, subjecting the prints to a high pressure calendering process (40 tons, one or both rolls heated to 320-400°C.) and then polymerizing the resins on the fiber. The condensate is prepared by combining 1.5 parts of aqueous formaldehyde with one part of melamine in alkaline solution. All kinds of pigments may be added to the paste. The precondensate is sufficiently fixed on the fabric after passing the goods over heated drums. The next step consists of polishing or glazing the fabrics by leading them through the hot, high pressure calender. The luster would disappear again on the printed areas as well as on the ground if the fabrics should be washed in this phase. But by a subsequent polymerizing (curing) operation at 450°F. for a fraction of one minute or at 300°F. for 3-5 minutes, the effect becomes durable and withstands washing treatments so that after washing a lustrous pattern (colored, white or non-colored) appears on the dull ground. The resin has to be printed with a thickener (starch paste, tragacanth, protein thickening). Various plasticizers such as dibutylphthalate may be added to the printing paste.

Reference:

U. S. Pat. 2,123,153 (Celanese): describes a printing process with a paste containing urea formaldehyde, used for cross prints over pre-printed acid dyes. The dyestuffs are only fixed on the cross-printed areas and these patterns are thereupon glazed by high pressure ("Ciré" effect).

Printing Vat Dyestuffs—Ferric Salts, Reduced by Actinic Light D, 2, 01

Brit. Pat. 597,982 (Bleacher's Associated, Ltd., Farrington et al., February 6, 1948)

A printing effect, brought about by the action of actinic light on certain ferric salts such as ferric ammonium oxalate, tartrate citrate or ferric glycollate is protected by the present patent. It is known that these ferric salts become converted into ferrous salts by the actinic light rays. These ferrous salts have a strong reducing action on vat dyestuffs when applied in alkaline solutions (see reference below). The authors combine these two reactions in order to obtain fixation of vat dyestuffs in a new and original procedure. A cotton fabric is padded with a vat pigment suspension (for instance with Caledon Jade Green X 300% paste, 1:10 diluted with water) and then padded a second time in amber light in an ammoniacal solution of ferric ammonium sulfate plus ammonium citrate. After drying (obviously also under exclusion of full sunlight) a negative is placed on the fabric and then exposed for 15 minutes to the light of a strong carbon arc lamp. It is then treated at 75°C. with soda lye, rinsed and acidified in hot oxalic acid, rinsed and soaped. A print, complementary to the negative applied, results.

Reference:

The basic reaction of this process (photoreduction of ferric chloride for instance in alcoholic solutions) has been discussed in theoretical papers, e.g., *J. Indian Chem. So.*, 1933, 91 and 101 (Prasad) and 1931, 489, etc. No practical application of this reaction, however, has apparently been proposed up to now.

ABSTRACTS

Textile Printing

F. Farrington, The Journal of the Society of Dyers and Colourists, page 269, Vol. 64, No. 8, August, 1948.

This is the fifth John Mercer lecture. It presents an interesting historical sketch of the development and progress in textile printing from Mercer's time to the present.

Block Printing

P. Chadwick, The Journal of the Society of Dyers and Colourists, page 274, Vol. 64, No. 8, August, 1948.

This paper first presents an historical review of the subject and then proceeds to present day practice. Apparatus required consists of the table, sieve, blocks and maul. Tables are made of flat slabs of stone, slate, iron or concrete covered with a printer's woolen blanket, over which is a waterproof printer's skin supported on an iron framework. The woolen blanket is resilient so that it yields when the block is mauled. The sieve and swimming tub are constructed on wheels. The sieve is a piece of wool felt, placed on a piece of thin mackintosh fastened to a rectangular piece of wood, the whole of which is floating on the swimming tub. The swimming tub is filled with old color to provide an elastic support to enable the color charged sieve, when placed upon it, to give up its color evenly and regularly to the block. In actual printing, the material is pinned or gummed to the table, and the sieve saturated with color brushed on evenly. The face of the block is charged with color by pressing it twice on the sieve in different directions and the block is then applied to the cloth, striking it on the back with the maul to insure a full impression. Succeeding impressions are made in the same manner.

The Screen Printing of Textiles

E. S. Beton, The Journal of the Society of Dyers and Colourists, page 276, Vol. 64, No. 8, August, 1948.

Screen printing affords a convenient means of handling medium quantities, up to two or three thousand yards to a coloring, at compaartively low cost, low capital outlay and comparatively low demand for highly skilled labor. The common screen consists of fine bolting silk stretched tightly over and cemented to strong wooden rectangular frames. A separate screen is required for each color. The simplest method of screen making is to trace a design on the silk and paint out the portions not required. Another way is to paint or print on the screen a suitable resist and after allowing to dry, paint over the whole surface with a lacquer, dry, and wash in warm water to dissolve the resist which takes with it the lacquer, except in the unresisted portions. The most important method is to make the screen photographically. The original design is traced on to a negative and then reproduced photographically on a screen surface which has been coated with a gelatine solution of ammonium dichromate. Exposure renders the gelatine insoluble and a hot water wash removes the gelatin mixture from the unexposed portion. The insoluble gelatin is strengthened by lacquering one side of the screen and cleaning out with solvent from the other side, then lacquering the other side, turning over, and cleaning out with solvent once more. There are a number of refinements and improved methods of screen structure and screen making mentioned.

Printing is carried out on wooden or concrete tables from 30 to 100 yards in length. The color is spread evenly over the screen. After such furnishing of the color the screen is picked up and carried to the next position. The length of the piece is traversed once for each color of the design. The table surface may be of glass, plastic, wax layer, woolen blankets covered with a thin film of gum, or other materials. A number of methods of improving the process and mechanizing it for greater production are mentioned.

The Hydrosulfites Production, Properties and Textiles Applications

G. Brearley and J. Starkie, The Journal of the Society of Dyers and Colourists, page 278, Vol. 64, No. 8, August, 1948.

A review of the methods of production of the hydrosulfites and sulfoxylates is given. The properties of the following three groups of commercial sodium hydrosulfites are briefly given: (1) sodium hydrosulfite of approximately 90% $Na_2S_2O_4$ content with the addition of a small percentage of sodium carbonate or sulfite as stabilizer (vat dyeing and printing and fiber bleaching; bleaching of soaps, oils, fats, glues, gelatine, and China clay, and in sugar refining); (2) sodium hydrosulfite (2 parts) with anhydrous sodium pyrophosphate (1 part) (silk and wool bleaching, and cleaning white cotton threads in vat-dyed materials); (3) sodium hydrosulfite with addition of sodium carbonate (stain remover in laundry work). The properties of the sulfoxylates are given according to the following: (1) sodium formaldehyde sulfoxylate (vat color printing, discharging, and stripping; glue bleaching); sodium formaldehyde sulfoxylate with additions (discharge of Indigo dyed cotton, white discharge styles on wool and silk); (2) normal zinc formaldehyde sulfoxylate (stripping and discharge printing on silk goods, soap bleaching); normal zinc acetaldehyde sulfoxylate (special printing purposes and, in conjunction with chlorine, for stripping certain types of dyes); (3) basic zinc formaldehyde sulfoxylate (stripping low woolens and rags).

Several variations of the usual methods of application designed to deal with special textile problems are described in detail. Physical methods of analysis are discussed.

A Method for the Graphical Representation of the Dyeing Properties of Acid Wool Dyes

H. Ris, W. Stocker and E. W. Thommen, The Journal of the Society of Dyers and Colourists, page 297, Vol. 64, No. 9, September, 1948.

The form of graphical representation chosen is intended primarily to serve practical ends, by summarizing the characteristic properties of a dye in as simple a manner as possible, thus removing the need for a lengthy study. From this knowledge the most suitable dyeing process can be decided. The curves can also be of use in choosing mixtures of dyes.

The production of level dyeings is analyzed and it is concluded that the phenomenon of leveling is complex in nature, with the dye, fiber and dyeing procedure all playing a part in producing a level dyeing. Two properties form the basis of the graphical representation: rate of exhaustion and migrating power.

All dyes are tested at the same depth of color and the "auxiliary type depth 1" has been chosen as standard, and is designated as 100%. Dyeing prepared with 90%, 80%, 70% . . . 10% of the quantity of dye necessary for the auxiliary type depth 1 form the standards of comparison for the curve dyeings. The dyeing procedure for estimating the points of the exhaustion curve is as follows:

"The dyeing is started at 40°C. and continued for 15 min. at this temperature. The bath is then warmed so that the temperature rises 1°C. every minute. After

reaching the boiling-point, i.e. 75 min. after the beginning of the trial, dyeing is continued at the boil for another hour. The following factors are kept constant—

Textile material.....Worsted yarn
Water .....Distilled water
Liquor: goods ratio. 80:1

For a single curve, eight dyeings in a solution equivalent to the auxiliary type depth are made in separate dye beakers, one dyeing being removed at each of the time-temperature stages shown in the curve, i.e. at intervals of 15 min. up to the boil and 30 min. at the boil. The dyeings are then compared with the standard dyeings, and the depth of color is assessed in every case. From the eight values thus obtained an exhaustion curve may be plotted."

The points for plotting curves of migrating power are obtained as follows:

"Three dyeings in auxiliary type depth are boiled with an equal weight of undyed material in a boiling, dye-free, i.e. blank, dyebath. All experimental conditions are identical with those for the exhaustion curves. The corresponding samples are withdrawn after 30, 60 and 90 min., and the degree of migration is estimated by means of standard dyeings. The quantity of dye lost by the dye material is shown by the upper curve. The lower curve gives the corresponding quantity of dye taken up by the originally undyed material."

Graphs are given for a few typical dyes and discussed with respect to dyeing properties, choice of the most appropriate dyeing method and choice of suitable combinations of dyes. It is stressed that the graphs indicate only the general dyeing characteristics of the dyes as, under practical conditions, there will be factors affecting the rate of exhaustion. They should be used as instruments which can be combined with the experience gained in practice in order to arrive at better dyeing results.

The Action of Light on Cellulose Acetate Rayon and Nylon Dyed with Duranol, Dispersol, S. R. A. and Solacet Dyes

G. S. Egerton, The Journal of the Society of Dyers and Colourists, page 336, Vol. 64, No. 10, October, 1948.

A study has been made of the photochemical degradation of cellulose acetate and nylon yarns dyed with dispersed and soluble acetate dyes. The effect of 64 dyes was examined, 20 Duranol, 16 Dispersol, 16 S.R.A. and 12 Solacet brands. The yarns were exposed to light behind glass, and measurements were made of the loss in strength of the yarns after exposure in atmospheres at controlled relative humidity. Many of the dyes tested increase the loss in strength of nylon, in some cases to a considerable extent, but have a very much smaller effect on the degradation of cellulose acetate rayon. In many cases the loss in strength of the dyed cellulose acetate rayon is less than that of the undyed yarn. The photochemical degradation of both nylon and cellulose acetate rayon, in either the dyed or undyed state, appears to be due to a process of oxidation, since the degradation is negligible in the absence of oxygen in the surrounding atmosphere. There is a large difference between the photochemical activity of dyes on nylon and on cellulose acetate rayon, with respect to the rate at which they sensitize the degradation of the textile material. In previous work it had been shown that undyed cotton yarn was considerably more degraded when exposed to light in proximity to, although not in actual contact with, an active vat dye, provided that moisture was present in the surrounding atmosphere of air. It appeared that this was due to the production of hydrogen peroxide (by the vat dye) which enhanced the degradation of the undyed cotton yarn. Similar experiments are performed with undyed yarns of cotton, nylon and cellulose acetate rayon exposed to sunlight in proximity to various acetate dyes which had been found to accelerate the photochemical degradation of nylon. A volatile oxidizing agent was produced, presumably hydrogen peroxide, by the acetate dye. The increased attack on the undyed nylon and cellulose acetate rayon was slight and very much less than that on cotton. Apparently the nylon and rayon have a resistance to oxidation by the volatile hydrogen peroxide. Many of the dyeings of nylon made with acetate dyes suffer considerable degradation in dry air. This is taken as an indication of the susceptibility of nylon to attack by activated oxygen where the dye absorbs the light energy and transfers this energy to the oxygen of the air, the oxygen thus becoming activated. The loss in strength of cellulose acetate rayon when exposed to sunlight in dry air is small and is not significantly increased by the presence of an acetate dye. Titanium dioxide seems to produce appreciable degradation of cellulose acetate rayon in dry air by direct oxidation. The observation, that on nylon a dye exhibits to a marked extent its photosensitizing properties, appears to be closely related to the fact that most dyes have a lower light fastness on nylon than they have on other textiles. The general tendency appears to be for those dyes that are photochemically active, e.g. in sensitizing the degradation of textile fibers, to be of reduced light fastness. The photochemical activity of acetate dyes does not seem to depend upon a specific chemical group.

Considerable experimental data is given.

Permanent Finishes on Viscose Rayon Depending on Cross-Bonding

W. G. Cameron and T. H. Morton, The Journal of the Society of Dyers and Colourists, page 329, Vol. 64, No. 10, October, 1948.

Evidence is presented which demonstrates the existence of cross-bonds in the molecular structure of viscose rayon modified by treatment with the following: acid formaldehyde, borax, acetone-formaldehyde, urea-formaldehyde, melamine-formaldehyde, glyoxal, Kaurit A1, Kaurit F1 (or WF) and Kaurit AF1. In a resin treatment, e.g. the urea-formaldehyde anti-crease process, the greater part of the material is deposited between the molecules of cellulose in the amorphous regions of the fiber. The change in fiber properties, however, is due mainly to a much smaller amount of reactant actively cross-bonding adjacent molecules. In technically important modifications of viscose rayon there is one cross-bond to each 40-100 glucose residues of the fiber cellulose. In the majority of instances the behavior of the cross-bonds studied differ widely in stability and the technical importance of this point is indicated. The technical processes depending on cross-bonding are reviewed, and the anti-crease process is discussed.

Finishing Symbols

C. Norris Rabold, Textile World, page 93, Vol. 99, No. 1, January, 1949.

These finishing symbols are presented to give finishers and others a handy means for avoiding existing confusion in recording detail in manufacturing, engineering, and research departments. It is realized that the list is not complete and that some of the symbols may require revision. A number of companies and individuals submitted ideas and added symbols to produce this compilation by Mr. Rabold.

Wool Dyeing Faults Can Be Prevented or Cured

K. E. Marsden, Textile World, page 135, Vol. 99, No. 1, January, 1949.

A number of faults are discussed together with suggestions for their prevention or cure.

Publications Abstracted in this Issue

Textile World—McGraw-Hill Publishing Co., 330 West 42nd Street, New York 18, N. Y.

The Journal of the Society of Dyers and Colourists—The Society of Dyers and Colourists, 31-34 Piccadilly, Bradford, Yorkshire, England.

Proceedings of the
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Northern New England Section to Meet on March 18th

A DINNER meeting of the Northern New England Section will be held on March 18th at the Boston City Club, 14 Somerset Street, Boston. Dinner will be served at 6:00 P.M.

The technical program will be as follows:

C. P. McClelland, Carbide & Carbon Chemicals Corp., "Surface Active Agents in Fire Fighting Application to the Textile Industry." Mr. McClelland received his M.A. in Organic Chemistry from Wesleyan in 1936 and was at Mellon Institute on a Carbide & Carbon Fellowship until 1943 doing research on sales development in organic solvents. He then worked on a U.S.Q.M.C. project on solid fuel blocks and since 1944 has been with Carbide & Carbon.

William B. Uhler, President, Blackman Uhler Company, Inc., Spartanburg, South Carolina, "Fugitive Identification for Textiles." Mr. Uhler attended Sheffield Scientific School at Yale and after four years with the Passaic Cotton Mills he started work in 1924 on the development of spray oiling for textiles. Alfred T. Grant, Plant Chemist, Pacific Mills, Worsted Division, Lawrence, Massachusetts, will lead the discussion. Mr. Grant is a graduate of Lowell Textile Institute.

Rhode Island Section to Meet March 25th

A DINNER meeting of the Rhode Island Section will be held on March 25th at Johnson's Hummock Grill, Providence, R. I. The speaker will be Dr. Harry W. Grimmel, Metro Dyestuff Corp., West Warwick, R. I. His subject will be "Headaches of the Dyestuff Chemist." An additional feature will be the showing of the Braves' world series motion pictures.

Dinner arrangements are in charge of Kenneth Bush of American Aniline Products, Inc.

Committee for National Convention

THE committee for the 1949 National Convention has been organized and preliminary planning has been started, it has been announced by Walter F. Fancourt, 3rd, W. F. Fancourt Co., general convention chairman.

The Philadelphia section will be host for the three-day meeting to be held at the Chalfonte-Haddon Hall in Atlantic City, N. J., October 13-14-15.

Mr. Fancourt stated that Ernest E. Rettberg, Jr., of Scholler Brothers, has been named assistant general chairman while the following chairmen have been appointed for the various phases of the convention:

Dining, Albert H. Seitz, American Aniline Products, Inc.; *entertainment*, John W. Jordan, Alco Oil & Chemical Co.; *exhibits*, M. H. Klein, Sandoz Chemical Works, Inc.; *publicity*, Ralph W. Jones, "Daily News Record"; *printing and personnel*, Percival Theel, Philadelphia Textile Institute; *reservations*, Walter G. Hamlen, Jr., E. I. duPont de Nemours & Co., Inc.; *ladies*, Richard L. Jones, Royce Chemical Co.; *registration*, A. E. Raimo, John Campbell & Co.; *reception*, Charles A. Seibert, E. I. duPont de Nemours & Co., Inc.; *transportation*, James P. Conaway, Delta Company, Inc.; *technical*, William O. Neeb, Geigy Company, Inc.

Meeting, Philadelphia Section

A MEETING of the Philadelphia Section was held on January 28th at Kugler's Restaurant in Philadelphia.

Arthur M. Gordon, 1948 Section Chairman, thanked his officers and committeemen for a most successful year and then introduced James Dixon as the 1949 Section Chairman.

Chairman Dixon presented Mr. Gordon with a Shrine lapel pin as a token for his work for the Section. He then introduced the new 1949 officers and announced the following section committee chairmen:

W. O. Neeb, Geigy Co.—Program.

A. W. Etchells, Hellwig Dyeing Corp.—Sectional Research.

E. R. Beigbeder, National Aniline Div.—Membership.

Ralph W. Jones, *Daily News Record*—Publicity.

J. A. Woodruff, American Viscose Corp.—Inter-Sectional Contest.

J. W. Jordan, Alco Oil & Chem. Corp. and A. H. Seitz, American Aniline Products—Annual Outing.

Other appointments included the following:

Dr. O. B. Hager as Judge for the Intersectional Contest.

M. H. Klein, Sandoz Chem. Wks., E. Simmat, Nolde & Horst Co., and Jackson Bauer, Fred Whitaker Co., as members of the Sectional Research Committee to serve 3 years.

W. F. Fancourt, 3rd, National Convention Chairman, announced the committee chairmen for the 1949 Convention in Atlantic City.

Prof. Theel announced that the Bylaws Committee had received 297 approvals and 6 disapprovals to the new bylaws. Therefore they were approved and are now in effect.

The technical program was under W. O. Neeb, Geigy Co., who announced his Committee as follows:

John Linton, 3rd, Janero Dye Wks.

K. L. Harper, Franklin Process Co.

G. J. Littlewood, 3rd, G. J. Littlewood Co.

V. Hartquist, Jefferies Dyeing Co.

Geo. Altenbaumer, Fred Whitaker Co.

Mr. Neeb then introduced Dr. O. B. Hager as the speaker who presented the third prize winning paper of the Philadelphia Section at the Convention in Augusta, Ga. on the subject "Some Phases of High Temperature Dyeing."

The members of the committee answered questions and a lively discussion followed. The prize for the question period was won by Geo. Altenbaumer of Fred Whitaker Co.

One hundred and seventy-six members and guests attended the dinner preceding this meeting while 190 were present at the technical session.

Respectfully submitted,
THOMAS H. HART,
Secretary.

Winter Meeting, Piedmont Section

THE Winter Meeting of the Piedmont Section was held at the Poinsett Hotel, Greenville, S. C., Saturday, January 29, 1949.

A luncheon and business meeting was attended by the officers of the section at 1 P.M.

The technical program was opened at 3:30 P.M. The first speaker was Dave E. Truax, Stein, Hall & Co., Charlotte, N. C., who spoke on "Textile Printing Thickeners." The second half of the program was presented by J. Leon Moore, Electrochemicals Department, duPont Co., Charlotte, N. C., whose subject was "The Preparation of Cotton Goods for Dyeing and Finishing by the Continuous Open Width Peroxide Process."

At 5:00 P.M. the Research Committee met in the Club Room to discuss and plan the 1949 program.

The banquet was held in the Ballroom at 7:00 P.M. and was attended by approximately 150 members. The speaker for this occasion was Norman F. Barnes, General Electric Co., Schenectady, N. Y., who, while delivering his message "Color Facts and Fantasies," gave a very interesting demonstration.

Respectfully submitted,
EDWIN A. BRIGGS,
Secretary.

157th GENERAL RESEARCH COMMITTEE MEETING

THE 157th meeting of the General Research Committee was held at the Hotel New Yorker in New York, Friday, January 28, 1949 at 1:30 P.M. Chairman J. Robert Bonnar presided.

Report of Director of Research

Dr. Stiegler gave a short report of the activities at Lowell, stressing the fact that one phase of the work on wash fastness has been completed to the satisfaction of the Wash Fastness Committee, who reported the detail later.

Because of recent developments in the calibration of the rain tester, a joint project of the A.A.T.C.C. with the National Association of Wool Manufacturers has been temporarily held up until a conclusion can be reached on the spray head in the rain tester.

With reference to the work on the American Viscose Company fellowship, there has been some delay because of the loss of the incumbent of this fellowship and the lack of a replacement up to now.

The Lowell Laboratory is still working in close cooperation with the Committee on Flammability in order to improve present instruments and testing procedures.

Wash Fastness

After some further general comments the Chairman called upon Mr. Seibert, Chairman of the Committee on Wash Fastness. His report was very encouraging because his committee is now satisfied that the work done at Lowell enables us to say that the use of the new accessories for the Launder-Ometer provides a test in that instrument which will be reasonably equivalent in destructive action to five commercial launderings. Arrangements have been made to secure sufficient additional tubes so that they may be check-tested in five or six other laboratories in order to establish the validity of the proposed new test method. Mr. Seibert also explained the development of a high speed agitator type of test equipment which in three to four minutes effects as much color damage as 30 repeated commercial launderings. There appears to be a possibility of getting accelerated data which will probably not be as generally applicable as the regular wash test but will be very useful for classification of fabrics from a laundering point of view. Further references were made to the survey jointly conducted by us with the American Standards Association. It appears that some data is already available from previous consumer surveys which will be made available, and further consumer surveys will be made in the near future.

Light Fastness

Mr. Holst reported for the Committee on Fastness to Light. The calibration papers which in all tests have proved satisfactory are now available for distribution. Those who have made requests should receive them promptly and it is the opinion of the committee that this will prove to be of great value to the textile industry. Complete instructions for the use of the papers are available.

A progress report was made on the investigation of the General Electric Totalizing Fade-Ometer, as a means of Fade-Ometer calibration. Further work is involved before a final report can be given. Mr. Holst referred to criticism in European quarters of the A.A.T.C.C. Blue Wool Standards of Light Fastness. Swatches of the British and German standards, together with our standard, have been exposed and are now being circulated among committee members so that conclusions may be reached at a future meeting.

Perspiration Fastness

John Dalton, reporting for the Committee on Fastness to Perspiration, stated that the tentative method has been submitted to Dr. Stiegler for inclusion in the new *Year Book* and that the mechanical device used in making the new test was on exhibit at the meeting. He stated that the plates used in the tests must be glass and the pressure must be equal to 10 lbs. for the official test. He had no idea of the cost of making these instruments because the blueprints have not as yet been received. He moved that the proposed method previously submitted be adopted as a formal tentative standard method. After some discussion this was amended to read that the method as published will replace the previous method effective as soon as the equipment is made available to the trade. In this form the motion passed.

Chemical Analysis and Testing

Professor Theel reporting for the Committee on Chemical Analysis and Testing announced that Monograph No. 1, on which his committee has been actively working for over a year, has been formally turned over to the Publications Committee and is finished so far as his committee is concerned.

Fire Resistant Materials

In the absence of Mr. Redmond, Chairman of the Committee on Fire Resistant Materials, Dr. Stiegler read a report which had been prepared. The Committee had conducted cooperative tests at two different laboratories of American Cyanamid on two different fire resistant fabrics using both the latest experimental A.A.T.C.C. apparatus and the new American Cyanamid apparatus. Due to the sample holder in the A.A.T.C.C. apparatus the tests appear more severe than in the Cyanamid apparatus. A statistical study of the data secured is being made for review by the committee.

Flammability

Dr. Hager, for the Sub-Committee on Flammability, repeated the conclusions his committee had previously arrived at and stated that these conclusions indicate the need for further work at Lowell, which the committee feels will require some financial support. His committee is planning to take care of securing funds for this purpose.

Water Resistance

In the absence of Mr. Allen, Chairman of the Committee on Water Resistance, Dr. Stiegler explained that at their committee meeting inter-laboratory checks in six different laboratories had indicated

that in the new rain tester some differences in results may be ascribed to variation in the design of the spray head. Since the American Society for Testing Materials also is interested in this same problem, the committee is hard at work to arrive at a standard specification for the dimensions of the spray head and the specification for the number and size of the holes in the spray head.

At this point Chairman Bonnar referred to the fact that a recent check indicates that thirteen A.A.T.C.C. Standard Methods have been adopted as standard methods by the American Standards Association and will be so identified in our new *Year Book*. This is very gratifying progress, he said, in the program of inter-society cooperation to develop tests which are generally accepted.

Standard Soil

Mr. Vitalis reporting for the Committee on Standard Soil, stated that his committee is studying the standardization of reflectometers, the determination of washing specifications, and a study of detergents of varying effectiveness.

Snag Resistance

Dr. J. E. Smith, Chairman of the Committee on Snag Resistance was not able to be present, but Mr. Seibert read a report which he had prepared. This is another program on which A.S.T.M. and A.A.T.C.C. committees are collaborating. The A.S.T.M. Sub-Committee will consider the report of our committee at their next meeting. It is believed that we may expect approval of the sand paper test method in the near future.

Non-Woven Fabrics

Kenneth Barnard, reporting for the Committee on Non-Woven Fabrics, stated that a joint committee with A.S.T.M. is planning a symposium which will bring together recognized experts on test methods in this particular field.

Visual Aids

Mr. O'Neil, Chairman of the Committee on Visual Aids, referred to the discussion held by his committee on colorimeters and filters, and also reported on the study by his committee of the use of Aklo glasses as an aid in judging the effects of gas fume fading of acetate dyes. His committee has concluded that the glasses are suitable only for determining differences in strength where fading is on tone but are not suitable where a change of hue has been caused by the test. Since the glasses do not appear to be applicable his committee will test gas fading samples on a number of instruments in the hope that they may be able to define just what is an objectionable change in the test. Mr. Holst expressed the opinion that we should get the layman's point of view with respect to the use of the Aklo glasses as they may prove more useful to those people than appears to the trained members of the committee.

Insect Pests

Mr. Wilde reported for the Committee on Insect Pests and stated that the work of his committee has been completed and that it has been a cooperative job with members of the committees of A.S.T.M., N.A.I.D.M., and N.R.D.G.A. As a result of a great deal of work the committee reports that the present procedure is proven suitable for the purpose of measuring, under controlled conditions, insect damage. His committee has, however, improved the method of expressing the damage found. Calling the milligrams of damage or excrement weight found on the untreated fabric 100%, the difference between that and the amount on the treated fabric is expressed numerically as per cent protection. The new tentative method was accepted by the General Research Committee, and will appear in the next *Year Book*, and a paper has been written for the *American Dyestuff Reporter*.

Dimensional Restorability

John Dalton, reporting for the Committee on Dimensional Restorability, states that the committee has studied the effects of a number of factors which exist between laboratories and commercial spongers, and laboratories and commercial laundries. No final report can be made at this time.

Mr. Seibert, speaking again for the Wash Fastness Committee, expressed the opinion that developments have arrived at the point where a chairman should be appointed for a sub-committee on the wash fastness of wool. It was indicated that a chairman will be named in the near future.

Color

Dr. Stearns, speaking for the Committee on Color, asked for an expression of opinion on the part of the Research Committee in connection with a spectrophotometric testing procedure for dyes. He particularly wanted to know whether such a test procedure comes within the scope of his committee. It was generally agreed that his committee may proceed to the development of a tentative method.

The meeting adjourned at 4 P.M.

Those present were:

J. R. Bonnar, *Chairman*

H. W. Stiegler, *Research Director*

W. D. Appel, K. H. Barnard, W. H. Cady, H. C. Chapin, H. M. Chase, M. A. Dahlen, J. N. Dalton, C. W. Dorn, J. Epelberg, K. R. Fox, H. E. Hager, O. B. Hager, M. Harris, S. L. Hayes, A. E. Hirst, W. A. Holst, R. W. Jacoby, N. A. Johnson, A. J. Kellner, M. H. Klein, D. P. Knowland, G. O. Linberg, L. S. Little, P. J. Luck, J. E. Lynn, J. E. Meili, W. R. Moorhouse, J. E. Norton, J. F. Oesterling, L. A. Olney, F. J. O'Neil, W. F. Prien, C. N. Rabold, B. A. Ryberg, G. H. Schuler, C. H. A. Schmitt, C. A. Seibert, J. H. Skinkle, F. M. Steadman, E. I. Stearns, J. A. Stevenson, J. C. Stirling, F. Stutz, C. A. Sylvester, H. H. Taylor, P. Theel, F. V. Traut, F. Tripp, F. R. Tripp, E. A. Vitalis, W. von Bergen, J. F. Warner, H. E. Wilde, P. J. Wood

A. D. Nute

CALENDAR

WESTERN NEW ENGLAND SECTION
Meetings: April 8, May 20.

NEW YORK SECTION
Meetings: April 1, May 6.
Outing: June 17.

PHILADELPHIA SECTION
Meetings: March 11, April 15, May 20, September 16, November 11 (Kugler's, Philadelphia).
Outing: June 10.

PIEDMONT SECTION
Meetings: April 2 (Robert E. Lee Hotel, Winston-Salem, N. C.), June 24, 25, 26 (Ocean Forest Hotel, Myrtle Beach, S. C.), November 5 (Charlotte Hotel, Charlotte, N. C.)

HUDSON-MOHAWK SECTION
Meetings: March 18, May 20, September 16, November 18.
Outing: June 17.

NORTHERN NEW ENGLAND SECTION
Meeting: March 18 (Boston City Club, Boston)

RHODE ISLAND SECTION
Meeting: March 25 (Johnson's Grill, Providence)

COUNCIL
Meeting: March 25 (Hotel New Yorker, New York).

RESEARCH COMMITTEE
Meeting: March 25 (Hotel New Yorker, New York).

NATIONAL CONVENTIONS
1949: October 13 to 15, Chalfonte-Haddon Hall, Atlantic City.
1950: October 19 to 21, Statler, Boston.

Intersectional Contest—
First Prize Winner—

STABILITY OF VAT COLORS AT ELEVATED TEMPERATURES*

Presented by the
PIEDMONT SECTION

Committee

V. B. Holland, *Chairman*
R. E. Rupp
Charles B. Ordway
R. Hobart Souther
J. B. Neely
Linton C. Reynolds
Dave Truax
J. R. Ellis
C. C. Cayce
S. H. Williams, *Speaker*

THIS study was conducted to investigate the reactions of vat colors in reduction at elevated temperatures. With the knowledge that many reduced solutions of vat colors at elevated temperatures decomposed or changed shade rather rapidly, a determined search was planned in an attempt to find out whether or not such reduced solutions could be stabilized. Various factors were eliminated and definite steps established in an attempt to formulate suitable testing procedures. The testing methods chosen were selected on the basis that their findings could be correlated to plant practices. The search included the following major phases to be investigated:

1. The finding of some chemical means for aiding the degree of stability of reduced vat color solutions at elevated temperatures.
2. The determination of a practical high temperature that would be satisfactory for testing.
3. Quantities and types of alkalies to be used in reduction solutions.
4. Quantities and types of reducing agents.

Until the recent developments of high temperature dyeing, the majority of vat colors were normally applied in accordance to their recommended dyeing temperatures. These temperature recommendations varied from cold to 180°F., depending on the type and character of the individual dyestuff. It has been common knowledge to the industry that many types suffered either destruction or change of shade if the temperature were raised, or reduced solutions stood for an abnormal length of time. Dyestuff manufacturers have always carefully pointed out the temperature range at which each individual type should best be applied. It has also been known that certain vat colors, even in the cold dyeing class, could be dyed at a boil without injury to the dyestuff. No data was available to the industry regarding the many brands that produced change of shade, or partial destruction at high temperatures, and whether or not these colors could be stabilized to a point of practical application. This was our main problem, to determine if chemical changes in formulation could stabilize the reducing solutions of vat colors at elevated temperatures. The knowledge that vat blues of the BCS types readily suffered destruction or shade change by either prolonged reduction or high temperature reduction in dye baths resulted in the selection of this dyestuff to be used in the preliminary investigations. Of primary importance, also, was the fact that this dyestuff and all blues of its class represent to the textile industry one of the most important vat colors. Having available no other vat blues producing the same shade as BCS and with high temperature dyeing becoming daily more important, it was imperative that one or two things be accomplished: first, either a method developed to stabilize the present reduced brands of this color; or, second, the manufacturers develop a dyestuff that would stand high temperature reduction. The manufacturers up to this point having failed to develop such a blue of the same shade and character, that would withstand high temperature reduction, it was extremely important that the problem be approached from a standpoint of chemical application.

Any information, new or modification of present methods, that might be uncovered would be of great interest and value to the textile industry. A study of this dyestuff, when reduced even at its normal temperatures, showed stability of the reduced solution to vary considerably soon after the proper reduction took place. From the tests conducted, it was readily seen that once this dyestuff entered into a reduced state, progressive reduction did not stop. The dyestuff, in the presence of caustic soda and hydrosulfite, keeps on reducing through various stages of reduction, and at each stage dyeings made from the solutions produce slightly different casts. These progressive reduction steps can be noted in the color of the leuco solution, as well as in the final dyed shades. As the temperatures are elevated, the destruction, or change in shade, of this dyestuff is accentuated after being put into proper reduction with caustic soda and hydrosulfite. If the color stands in strong alkaline reducing solutions at elevated temperatures, within a few minutes the progressive reducing action continues until the dyestuff is completely changed in shade, or partially destroyed.

Many BCS brands of various manufacturers were tested for their behavior in this connection. Although not all standards reacted identically to each other, they all possessed the property of instability at the high temperatures used. Types of Vat Blue GCD also produced similar results. This color showed no greater stability at elevated temperatures under severe reduction conditions than the BCS types.

Selection of Temperature Range For Testing

After many series of tests a decision was made concerning the proper temperature to be adopted. Tests were run, using a temperature range of 175°F. to 210°F. From the results obtained, a temperature of 190°F. was agreed upon. A more positive control of reduction was obtained at 190°F. as when checked against 200°F. This was due to the higher rate of loss of hydrosulfite at a temperature of 200°F. and over. The power of reduction necessary

* Presented in Intersectional Contest, Augusta National Convention, October 23, 1948.

to reduce this dyestuff climbed only slightly between the temperatures of 190°F. and 200°. Measurements taken regarding the reduction force from 180°. to 190°F. increased only slightly. Based on the dyeings and tests, it was, therefore, concluded that at a temperature of 190°F. and a 5° plus or 5° minus differential would not greatly vary the final results. This tolerance would also be well within practical working limits of controlled temperature during plant operations.

Selection of a Proper Reduction Potential for Testing

One of the purposes of this search was to apply any beneficial findings to the aqueous continuous pigment piece dyeing process. We, therefore, were concerned with the testing of very strong reducing solutions, which are used in this method of dyeing. It was evident that attempts to stabilize a color under these conditions would be very difficult. It would have been much less of a problem to accomplish the same end, working with solutions producing a weaker reduction force. If any degree of stabilization were found by using strong reducing solutions, the findings could readily be applied to lower reduction concentrations. These solutions had to be of such strength that would enable the complete reduction of vat color pigment previously applied to a fabric to properly reduce the dyestuff on the fiber, using a time factor of 30 seconds.

As various high temperature dyeing methods by the pigment process have been carried out, in liquid mediums, over a wide range of speeds, a suitable time factor for testing had to be decided upon. The time factor selected played an important part in this entire series of reduction tests. The time of immersion of material in contact with reduced solutions, in practical operations, varies from five seconds to one minute. A time of 30 seconds was chosen as a factor that could be worked to laboratory testing rather readily, and also fall within the time cycles used in plant practices. It can readily be seen, therefore, that a reduced solution, having the ability to reduce a heavy shade of vat dyestuff in the time of 30 seconds and cover a range of vat colors in full strength shades, would have to possess extremely strong reducing powers.

Measuring the Reduction Potential

In normal dyeing application methods, Yellow G test papers are often used as an indicator to determine whether or not a reduced solution is in proper reduction. By a skillful use of such test papers, reduction baths can often be fairly closely maintained. A more accurate procedure, which is followed today by many plants, is by the actual titration of the reduced solution, titrating first for the caustic soda content and then for the amount of hydrosulfite as follows:

Caustic Soda (Sodium Hydroxide):

Pipette a 10 ml. sample into a 250 ml. flask containing 5 ml. of neutralized formaldehyde and 100 ml. of cold water. Add 2 cc. of phenolphthalein and titrate the resulting solution with N/10 sulfuric acid until the *pink* color of the solution just disappears.

Save this solution for the hydrosulfite titration cc. of N/10 sulfuric acid required x 0.033 = lbs./gal. caustic soda.

Hydro (Sodium Hydrosulfite):

Add 1 to 2 ml. of starch to the solution from the caustic soda titration and titrate with N/10 iodine until a *blue* color persists in the solution.

cc. of N/10 iodine required x iodine factor = lbs./gal. hydro.

More recently it has been found that the reduction may be measured by the use of a potentiometer. By using the proper electrodes, the reduction force of the solution may be measured in terms of millivolts. This instrument is bound to play an important part in the future, concerning the further investigations to be made regarding the proper reduction potentials to be maintained when dyeing vat colors under many conditions. Spectrophotometric readings may be used to an advantage in measuring the degree and state of color reduction of leuco solutions. It has been found that from the color of the reduction bath, according to such readings, a solution may appear to be in proper color reduction and still may not dye properly. In many cases, such as when glucose or sugars have been added to these reduced solutions, the actual affinity of the dyestuff in reduced form seems to have been impaired or interfered with after standing a short period of time. We wish to point out that unless actual dyeings have been made of such reduced solutions, the use of an instrument, such as a spectrophotometer, in measuring the color of the leuco state of the dyestuff is not reliable in assuring that such solutions would properly dye to full color value. Our investigations have shown that correlating the actual dyeings and measuring the reduction force of these solutions with a potentiometer aided in arriving at definite conclusions. During the course of this study we adopted a practical visual color test, in checking the power of reduction, which was used as standard, by the following procedure:

Method Used for Testing Proper Reduction of Pigment Padded Material

The vat color pigment, pasted in water, was padded on a piece of material in the concentration of one pound of double paste per gallon and dried. Part of this material was then developed with the normal concentrations of caustic soda and hydrosulfite at a regular dyeing temperature of 130°F. for 45 minutes. This piece of fabric was used as standard for shade and crocking. Pieces taken from the same padded material unreduced were run through various strengths of reduced solutions at a temperature of 190°F. for a period of 30 seconds. The strengths of solutions were scaled to a point until such pieces, when tested against standard, showed the same degree of dry crocking and color value as standard. It was readily seen that when the reduction potential was low, testing, against color value comparisons alone was not sufficient, but a dry crock test did indicate whether or not all particles of dyestuff were properly reduced and dyed to the fiber. After determining that a reduced solution could be set up, which would produce the proper reduction of dyestuff as laid out in the time of 30 seconds at a temperature of 190°F. with caustic soda and hydrosulfite, then the series of tests were conducted with respect to the possibility of stabilizing solutions of this strength. In all cases where dry crocking tests showed inferior results to standard the final wash tests indicated improper fixation of the dyestuff. Indanthrene Blue BFP Double Paste was the BCS standard used throughout the majority of these tests.

Length of Time of Stability

With the prior knowledge that reduced solutions of Vat Blue BFP showed a change of shade under normal reduction conditions in 15 minutes at temperatures of 130° to 140°F., tests were run, endeavoring to lengthen this time of standing. Thirty minutes was the time factor selected. If stability could be produced for this period of time, these tests would be of practical value. Many trials showed varying degrees of stability up to 1½ hours with only a slight change of shade. Running tests this length of time produced a problem of maintaining proper hydrosulfite content at elevated temperatures. By using the time of 30 minutes, the problem of maintaining a constant reduction was lessened. As the unprotected Blue BFP broke badly in reduced form in from 3 to 5 minutes at 190°F., 30 minutes was considered a satisfactory length of time for correlating the many chemical formulations that were tested.

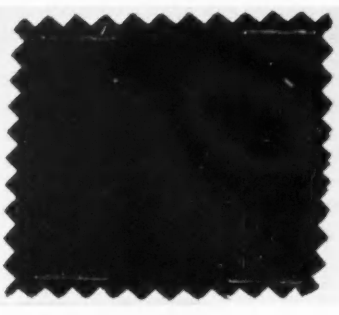
METHOD USED FOR TESTING PROPER REDUCTION
OF PIGMENT PADDED MATERIAL
PADDED AND DRIED—1 lb. PER GALLON
INDANTHRENE BLUE BFP DOUBLE PASTE
UNREDUCED PIGMENTED MATERIAL

STANDARD

REGULAR 45 MINUTE REDUCTION

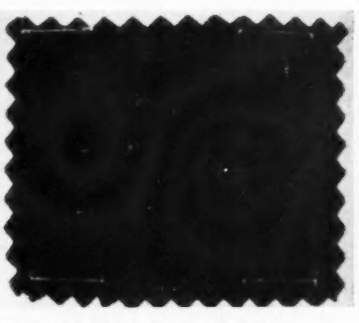
REDUCTION TIME 45 MINUTES
FORMULA
1 oz. Caustic
1 oz. Hydro
Temperature 130°F.

CORRECT REDUCTION



REDUCTION TIME 30 SECONDS
FORMULA
4 ozs. Caustic
2 ozs. Hydro
2 ozs. Dextrine (White Corn)
0.5 ozs. Indanthrene Blue BFP Double Paste
Temperature 190°F.

IMPROPER REDUCTION



REDUCTION TIME 30 SECONDS
FORMULA
1 oz. Caustic
1 oz. Hydro
2 ozs. White Corn Dextrine
0.5 ozs. Indanthrene Blue BFP Double Paste
Temperature 190°F.

Correct reduction, using the proper amount of chemicals, in the time of 30 seconds showed the crock tests to equal the regular 45-minute reduction at lower temperatures; improper reduction, although the color value of the sample was comparable, the crock tests did not equal the other two samples in this photo. These crock tests would not reproduce in this photo.

Effect of Various Common Alkalis to Stability and Reduction

Having arrived at a definite testing procedure, the search was continued with the more commonly used types of alkalis. As two opposing problems were concerned, it can readily be seen that the alkalis having a lower pH value, were not sufficiently active in producing a strong reducing solution. The milder alkalis in a few cases did assist in aiding stability, but under the test as set up they were not equal to caustic soda in reducing heavy shades of BFP in the short time of 30 seconds. All alkalis and combinations of alkalis were tested against caustic soda, which was considered standard. Exceptions were found in the case of a few dyestuffs, but the overall picture did not warrant their use in place of caustic soda.

The alkalis tested against caustic soda were:

1. Potassium Hydroxide
2. Potassium Carbonate
3. Soda Ash
4. Trisodium Phosphate

Potassium Hydroxide

This alkali could be used in place of sodium hydroxide with about equal results. No increase was seen in the stability of the reduced solutions when using this alkali. This product also failed to show any faster reduction times over caustic soda. Unless some advantage, either in stability or power of reduction, was produced, the additional cost of this alkali over caustic would limit its general use.

Potassium Carbonate

The resultant dyeings made with the Blue BCS types were not up to full color value when this product was tested. No increased stabilization was effected when tested against caustic. This alkali lacked

the necessary powers to completely reduce pigmented material in the time of 30 seconds.

Soda Ash

Soda ash produced similar results as potassium carbonate. Mixtures of these alkalis were then made with caustic to determine if combinations of such were beneficial. None of the dyeings made showed such combinations of alkalis to be of advantage. In most cases such admixtures lowered the color value of BCS dyeings.

Trisodium Phosphate

This alkali failed to produce the power of reduction necessary under the tests as set up with the Blue BCS brands. There exists a possible beneficial use for alkalis other than caustic in vat color application. These cases would be in connection with some dyestuffs that are affected by strong caustic soda solutions or dyeing by other special methods. Their use would be of benefit also in dyeing fibers other than cotton, such as silk and wool, using selected dyestuffs that were compatible with the milder alkalis.

As we were primarily concerned only with either stability or speed of reduction with BCS Blue, all alkali tests and combinations showed no advantages over caustic soda.

Reducing Agents

The commonly known types of reducing agents were checked for suitability, power of quick reduction being the first requirement; the second requirement being that of stability of the standing leuco solution. All products were tested against sodium hydrosulfite conc. After individual checks were made, admixtures of the reducing agents were tried. Some combinations looked promising, but the slight advantages shown did not warrant their consideration against standard hydrosulfite concentrated. Under different testing and dyeing conditions there is no question that the features of some of the reducing agents could be utilized to an advantage.

The following products were tested:

1. Hydrosulfite
2. Sulfoxylate-Hydrosulfite
3. Glucose
4. Commercial molasses and sugars, syrups
5. Sulfide of Soda

The time factor of reduction in 30 seconds and temperature of 190°F. ruled out all products except hydro. The sulfoxylate, or printing brand of hydro, which is stabilized with formaldehyde, failed to decompose quickly at 190°F. to produce a sufficiently active reduction.

A need exists in high temperature dyeing for a reducing agent having properties between hydrosulfite and sulfoxylate. An ideal compound would be a sulfoxylate that would disintegrate, or give off its formaldehyde, between working temperatures of 160°F. to 190°F. Admixtures of hydrosulfite and sulfoxylate were used to some degree of success, but sufficient reducing action is not produced by the amount of sulfoxylate used. Tests were run, making additions of small amounts of free formaldehyde to solutions of hydrosulfite concentrated. This procedure did not stabilize the reducing action of hydrosulfite sufficiently to be of value.

Glucose used alone and in conjunction with hydrosulfite produced too many complex forms of reduction that could not be checked consistently. While glucose and many brands of commercial sugars, syrups, and similar products, showed signs of some initial stabilizing action, over a period of 30 minutes these products either lost their value or interfered with the affinity of the leuco solutions.

The complex reactions between the leuco solution of the vat, along with hydro and the sugars, gave varying degrees of affinity to the dyestuff. Checks showed that during 5 minute periods color values and stability of a degree could be produced but, on standing, both color value and stability were either lost or impaired. Sufficient studies and tests were made to rule out the merits of products such as glucose and related sugars, as far as stabilizing agents were concerned, under the tests as set up.

From observations made while working with glucose and commercial sugars, the commonly used natural starches were brought under investigation. These included corn, potato, wheat, and tapioca. Stabilization effects were not produced, using the starches in their commercial forms.

Still hopeful that protective colloidal compounds might be what we were seeking led to the investigation of the many products made from starches and natural gums. Animal glue, sodium lignin sulfonate, British gum, polyvinyl alcohol, and dextrine were the next products tested as to their effect on stability.

The Phenomena of Dextrines

Previous observations made in the testing of certain brands of color indicated that the presence of dextrine might supply to the solution some slight degree of stability. Following a clue from these tests led to the entire investigation of the field of various dextrines.

As dextrines are made under many conditions from natural starches, hundreds of brands and classifications are in existence. To demonstrate the wide variance of protective action of two dextrines, both commercial, are shown examples 2, 3, and 4, a yellow corn, or canary dextrine, and a white corn dextrine:

No. 4—In one case no stability with yellow, or canary, corn dextrine.

No. 3—In the other, stabilization took place with white corn dextrine.

As both these dextrines were derivatives of corn starch, their reactions were startling.

Having found the marked difference in the dextrines, the search was continued to tie down just what it was in the various brands that produced these protective properties.

Various starch bases from which the commercial brands of dextrine were made were tested in an effort to determine whether or not one form might be more desirable than the other. Dextrines made from corn, wheat tapioca, and potato starches were all checked in this connection. Up to this point, analysis of our findings concerning the protective action of dextrine seemed to be tied in more generally with the alkali labile number (a measure of the dextrine that is readily attacked by alkali), rather than from the source or type of starch from which it is produced. The solubility of the dextrines tested failed to point out that the solubility could be used in determining the efficiency of the dextrines in the processes of vat dyeing. We could not find that the protective action of dextrine was in any way associated with its colloidal properties.

The Alkali Labile Number

As the alkali labile number for the analysis of the dextrines is tied in directly with their protective properties, the following information, according to T. C. Taylor, H. H. Fletcher, and M. H. Adams in the *Analytical Edition of Ind. Eng. Chem.*, Vol. 7, is given:

It is known that by measuring with hypoiodite the amount of material in a dextrine, starch, amylose, or starch product that is attacked by hot aqueous alkali, a number could be obtained that was an index to the peculiar make-up of the sample. Slight changes in the starch, dextrine, or starch product, that cannot be detected by such well-known determinations as viscosity, specific rotation, color with iodine, and initial reducing value are, however, immediately reflected in a change, in the stability of the product to the action of hot aqueous alkali. While this has been used in a qualitative way, the subsequent quantitative determination by iodometric titration of the extent of attack by the

COMPARISONS OF UNPROTECTED REDUCED SOLUTION
AGAINST
WHITE CORN DEXTRINE
VS
YELLOW CORN DEXTRINE

DYE BATH TEMPERATURE — 190°F.

Above dyeings made after solution stood 30 minutes.

DYEBATH CONTAINED:

—Per Gallon—

0.50 ounces Indanthrene Blue BFP Single Paste
4.00 ounces Caustic Soda Dry
2.00 ounces Hydrosulfite Conc.

Dyeing #3 contained—2 ounces per gallon White Corn Dextrine

Dyeing #4 contained—2 ounces per gallon Yellow Corn Dextrine

aqueous alkali has made the method of interest to starch chemists.

Every starch and starch product contains some material which is very quickly attacked by hot aqueous alkali, part of this same material is relatively slowly attacked by the same reagent. The latter part can be recovered substantially unchanged after the alkali has acted. The two parts have been called, respectively, alkali-labile and alkali-stable, the one being the antithesis of the other. Various pretreatments of the starches or their amyloses cause changes in the amount of this alkali-susceptible portion. By titrating iodometrically the alkali-digested solution of noncarbohydrate breakdown material having its origin in the alkali-labile portions, a number expressed in milligrams of iodine per hundred milligrams of sample may be obtained. This is called the alkali-labile value.

The procedure for determining alkali labile values is given as follows:

Solutions required:

1. 0.1 M sodium hydroxide, slightly more than 4 grams per liter, diluted to proper molarity.
2. 0.1 M hydrochloric acid, 8.5 cc. of reagent hydrochloric acid made up to 1 liter with water.
3. Concentrated hydrochloric acid, reagent.
4. 0.025 M sodium thiosulfate, 6.2 grams of $Na_2S_2O_3 5H_2O$ made up to 1 liter with water.
5. 0.025 M iodine, 6.3 grams of iodine plus 35 grams of potassium iodide made up to 1 liter with water.
6. Phenolphthalein, 0.05 gram made up to 100 cc. of 50 per cent alcohol.
7. Nitrazine yellow, 0.1 gram made up to 100 cc. with water.

The absolute strength of iodine and thiosulfate need not be exactly 0.025 M, but should be standardized carefully.

The sodium hydroxide, however, should be accurately standardized at 0.1 M (within 3 to 5 parts per thousand) with potassium acid phthalate, using phenolphthalein indicator. The hydrochloric acid need not be standardized unless it is desired to know how much sodium hydroxide is used during the digestion.

PROCEDURE. It is convenient to run 12 determinations (6 samples) at a time. Each sample is run in duplicate.

1. Weight approximately 50-mg. samples of the starch product into large Pyrex test tubes (20 x 2.5 cm., 8 x 1 inch). Weigh to 0.1 mg.
2. Add 10.00 cc. of exactly standardized 0.1 M sodium hydroxide to each test tube from a buret. The test tubes are loosely stoppered and floated in actively boiling water for 1 hour. Enough water should be used so that the tubes will float throughout the hour.
3. After the digestion, remove the test tubes from the bath, hold under running cold water for about 30 seconds, and then immediately acidify with 10 cc. of 0.1 M hydrochloric acid (use buret), with thorough shaking. It should not take over 1 minute from removal from bath to complete cooling and acidification.
4. Transfer the contents of the test tubes to 250-cc. Erlenmeyer flasks with two washings of 10 cc. each of distilled water. The time interval before the next step is not important. Two hours may elapse if necessary.
5. Add 2 drops of nitrazine yellow solution and neutralize with 0.1 M sodium hydroxide. Then add exactly (buret) 5 cc. excess of 0.1 M sodium hydroxide, and add immediately 5.00 cc. of 0.025 M standard iodine solution.

It should not take longer than 2 to 3 minutes for neutralization, addition of excess alkali, and addition of iodine. Set in a dark place at 25° to 30°F. for 45 minutes. It is convenient to run the samples at intervals of 2.5 to 3 minutes as suitable to the individual analyst.

6. Forty-five minutes = 1 minute after addition of iodine, add 5 cc. of concentrated hydrochloric acid, shake, then titrate immediately with 0.025 M thiosulfate. If the back-titer of thiosulfate is less than 3 cc., the resulting alkali-labile value will be high and 7 cc. instead of 5 cc. of iodine should be added for the oxidation of the next sample, so that the final back-titer is at least 3 cc. Some samples give a red color at the end point, so a little starch indicator has to be added; otherwise, the stable amylose material left in the solution will act as the iodometric indicator without added starch paste.

Calculate the number of milligrams of iodine consumed, divide by the weight of the sample, and multiply by 100. The result is the alkali-labile value.

Determination of Solubility of Dextrines

The solubility is determined by taking 19.0 grams of the sample and adding cold water to make volume up to 380 ml. After standing overnight, 50 ml. of the supernatent liquid is pipetted off, dried, and residue weighed. The solubility is obtained by multiplying the weight of the residue by 40.

It can be readily determined from the tests as shown that the white dextrines, having higher alkali labile numbers over the canary dextrines, show them to possess the protective powers necessary for the stabilizing of reduced vat solutions at high temperatures. The British gums and thin boiling starches, having very low alkali labile numbers showed no protective ability. It can readily be seen, therefore, that it would be more economical to use a white corn dextrine having the same alkali labile number in preference to a potato dextrine, which is relatively more expensive. It was determined at this point of the investigation that when analyzing for a type of dextrine most suited for its protective action, the main consideration would be the high alkali labile number of the product. The accompanying table lists a few of many brands, of dextrines tested in this connection, and the analysis of the products listed, giving their alkali labile numbers and their solubility. These products were rated in accordance to their protective powers in reduced BFP solutions.

Product	*Protective Action*	*Alkali Labile Number*	*Solubility*
Dextrine, Potato	Excellent	64.4	27%
Dextrine, white corn	Excellent	62.7	52%
Dextrine, white corn	Good	59.2	81%
Dextrine, white corn	Good	61.4	50%
Dextrine, white corn	Good	51.0	19%
Dextrine, potato	Fair	48.8	48%
Dextrine, white corn	Fair	53.8	47%
Starch, thin boiling corn	Poor	48.2	20%
Gum, Tapioca	None	27.7	1%
Gum, Tapioca	None	42.9	7%
Dextrine, Yellow corn	None	28.4	92%
Gum B-2, corn	None	25.0	78%
Gum, B-½, corn	None	15.0	20%

It may be seen from these analyses that the solubility of these products has no bearing at all on their protective powers. The alkali labile number on the other hand, regardless of the type of dextrine, indicates that the higher the number, the better protective action of the product. This particular series of tests, in rating these dextrines, gums, and starches, was carried out by the following procedure in a Launder-O-Meter. The formula used was as follows:

1½ grams of Blue BFP Double Paste
12 grams Caustic Soda
6 grams Hydrosulfite
400 cc. of Water

The amount of dextrine was varied in these tests from 9.0 grams down to 4.5. The dyeings were carried out 30 minutes at 190° F. With this treatment the standard formula without dextrine produced a similar grey shade as shown in all preceding tests. The dextrines marked from excellent to good gave enough protection at 9.0 grams concentration to produce the true shade of the dyestuff run according to this method. This method of testing the various brands of dextrine provides a simple procedure where the dyeings are carried out in a closed container where the factor of loss of hydrosulfite is not as pronounced as when the same procedure is followed by dyeing in open beakers. It may be concluded that all white corn dextrines do not produce the same protective action. Their value should be carefully checked and tested before being adopted for high temperature vat dyeing.

Quantities of Dextrine

Under the same influence of strong reducing solutions, a scale of tests was run to determine the concentrations of dextrine necessary to induce stability. For most efficient results laboratory findings showed quantities to range between 1 to 3 ounces per gallon white corn dextrine. Some dyestuffs required the maximum concentrations while others less affected reacted favorably using the lower concentrations.

The rated fastness to chlorine was unaltered when tests were conducted by dyeing Blue BFP at elevated temperatures, protected by dextrine.

British Gum, Polyvinyl, Animal Glue, Lignin Sulfonate, Glucose, Corn Starch, Yellow Corn Dextrine

Tests showing the effect of the above listed products and their lack of protective powers when tested against a suitable white corn dextrine. Testing method carried out as follows:

The color was brought to volume with water and the previously dissolved agents added. Temperature was brought to 190°F. Caustic and hydrosulfite conc. then were added to this solution together. Dyeing of fabric was made from solution for the duration of two minutes. The temperature was maintained at 190°F. for the 30-minutes standing period. Dye baths were titrated for loss of any hydrosulfite over the 30-minutee period and additions of this product made to maintain the starting concentrations, thereby keeping the reduction constant. All dyeings were air oxidized and soaped in the regular manner. Liquor ratio of dye bath was 1:40.

The white corn dextrine used as standard throughout this investigation had an alkali labile number 62.7 and solubility of 52%.

Tests concluded show that hot caustic solutions react with dextrine whereby the alkali labile number may be determined Investigations were then carried out to determine if caustic solutions reacted cold or at room temperature with dextrine. Dyeings made from solutions of caustic and dextrine that were allowed to stand over periods of time showed that the protective action of dextrine was lost or impaired, depending on the temperature of such solutions and the length of time of standing. The reaction between caustic and dextrine takes place even in cold solutions and is accentuated by any rise in temperature. This fact is important when utilizing dextrine as a protective agent in continuous dyeing.

Further investigations showed that the protective ability of dextrine is not lost if hydrosulfite is added to caustic and dextrine solutions at room temperatures. Examples No. 1 and No. 2 show these effects. In one case the caustic and dex-

COMPARISONS OF UNPROTECTED REDUCED SOLUTION
AGAINST
WHITE CORN DEXTRINE
VS
BRITISH GUM

UNPROTECTED #2 | WHITE CORN DEXTRINE #3 | BRITISH GUM #5

DYE BATH TEMPERATURE — 190°F.

Above dyeings made after solution stood 30 minutes.

DYEBATH CONTAINED:

—Per Gallon—

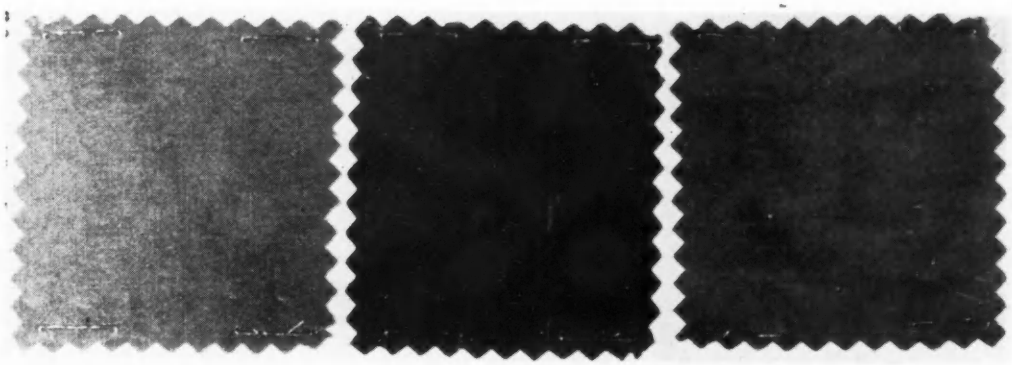
0.50 ounces Indanthrene Blue BFP Single Paste
4.00 ounces Caustic Soda Dry
2.00 ounces Hydrosulfite Conc.

Dyeing #3 contained—2 ounces per gallon White Corn Dextrine

Dyeing #5 contained—2 ounces per gallon British Gum

COMPARISONS OF UNPROTECTED REDUCED SOLUTION
AGAINST
WHITE CORN DEXTRINE
VS
CORN STARCH

UNPROTECTED #2 | WHITE CORN DEXTRINE #3 | CORN STARCH #6



DYE BATH TEMPERATURE — 190°F.

Above dyeings made after solution stood 30 minutes.

DYEBATH CONTAINED:

—Per Gallon—

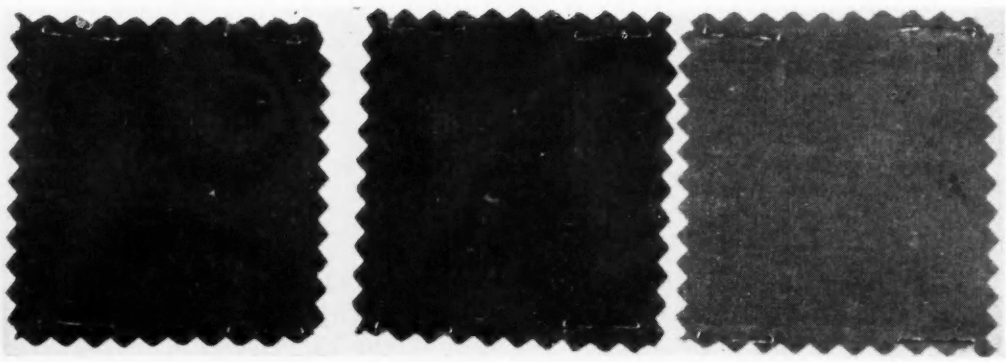
0.50 ounces Indanthrene Blue BFP Single Paste
4.00 ounces Caustic Soda Dry
2.00 ounces Hydrosulfite Conc.

Dyeing #3 contained—2 ounces per gallon White Corn Dextrine

Dyeing #6 contained—2 ounces per gallon Corn Starch

COMPARISONS OF UNPROTECTED REDUCED SOLUTION
AGAINST
WHITE CORN DEXTRINE
VS
GLUCOSE

UNPROTECTED #2 | WHITE CORN DEXTRINE #3 | GLUCOSE #7



DYE BATH TEMPERATURE — 190°F.

Above dyeings made after solution stood 30 minutes.

DYEBATH CONTAINED:

—Per Gallon—

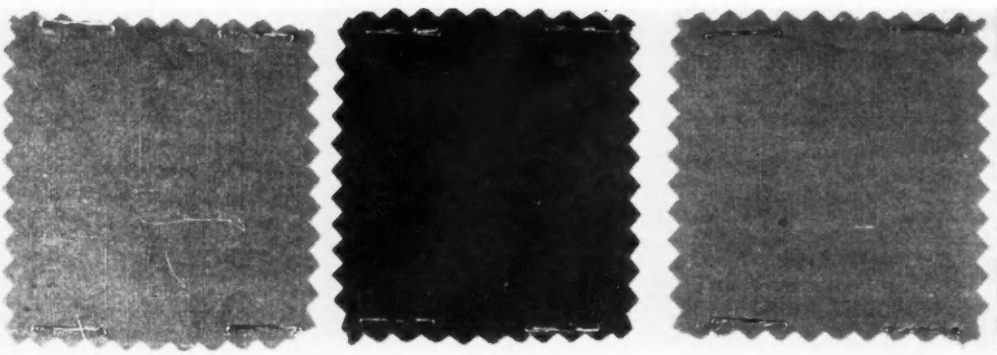
0.50 ounces Indanthrene Blue BFP Single Paste
4.00 ounces Caustic Soda Dry
2.00 ounces Hydrosulfite Conc.

Dyeing # 3 contained—2 ounces per gallon White Corn Dextrine

Dyeing #7 contained—2 ounces per gallon Glucose

COMPARISONS OF UNPROTECTED REDUCED SOLUTION
AGAINST
WHITE CORN DEXTRINE
VS
SODIUM LIGNIN SULFONATE

UNPROTECTED #2 | WHITE CORN DEXTRINE #3 | SODIUM LIGNIN SULFONATE #8



DYE BATH TEMPERATURE — 190°F.

Above dyeings made after solution stood 30 minutes.

DYEBATH CONTAINED:

—Per Gallon—

0.50 ounces Indanthrene Blue BFP Single Paste
4.00 ounces Caustic Soda Dry
2.00 ounces Hydrosulfite Conc.

Dyeing # 3 contained—2 ounces per gallon White Corn Dextrine

Dyeing # 8 Contained—2 ounces per gallon Sodium Lignin Sulfonate

COMPARISONS OF UNPROTECTED REDUCED SOLUTION
AGAINST
WHITE CORN DEXTRINE
VS
ANIMAL GLUE

UNPROTECTED
#2

WHITE CORN DEXTRINE
#3

ANIMAL GLUE
#9

DYE BATH TEMPERATURE — 190°F.

Above dyeings made after solution stood 30 minutes.

DYEBATH CONTAINED:

DYEING #2

—Per Gallon—

0.50 ounces Indanthrene Blue BFP Single Paste
4.00 ounces Caustic Soda Dry
2.00 ounces Hydrosulfite Conc.

DYEING #3

—Per gallon—

2 ounces White Corn Dextrine

DYEING #9

—Per gallon—

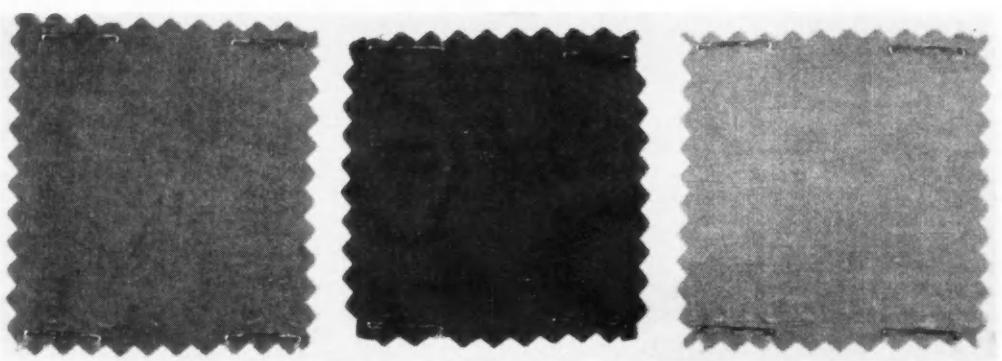
2 ounces Animal Glue

COMPARISONS OF UNPROTECTED REDUCED SOLUTION
AGAINST
WHITE CORN DEXTRINE
VS
POLYVINYL

UNPROTECTED
#2

WHITE CORN DEXTRINE
#3

POLYVINYL ALCOHOL
#10



DYE BATH TEMPERATURE — 190°F.

Above dyeings made after solution stood 30 minutes.

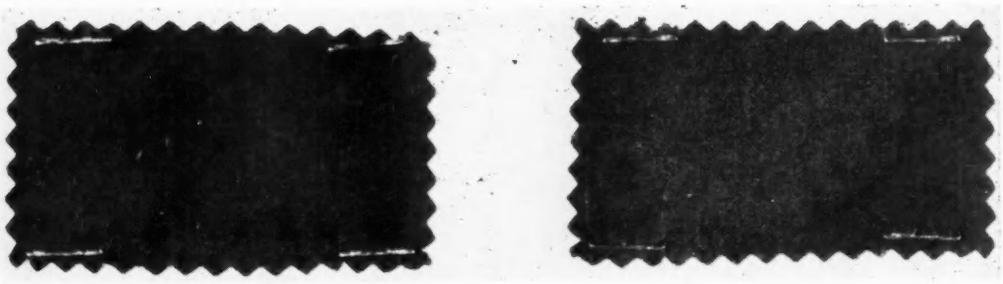
DYEBATH CONTAINED:

—Per Gallon—

0.50 ounces Indanthrene Blue BFP Single Paste
4.00 ounces Caustic Soda Dry
2.00 ounces Hydrosulfite Conc.
Dyeing # 3 contained—2 ozs. per gallon White Corn Dextrine
Dyeing #10 contained—3 ozs. per gallon Polyvinyl Alcohol

TESTS TO DETERMINE THE INFLUENCE OF CAUSTIC, AS WELL AS CAUSTIC AND HYDRO ON THE PROTECTIVE ACTION OF DEXTRINE WHEN SOLUTIONS ARE ALLOWED TO STAND COLD BEFORE USE.

#1 #2



CAUSTIC, HYDRO AND DEXTRINE SOLUTION ALLOWED TO STAND 2 HOURS COLD BEFORE USING.

CAUSTIC AND DEXTRINE ONLY ALLOWED TO STAND 2 HOURS COLD BEFORE USING.

In both cases the amount of color, caustic, hydro and dextrine were the same.

0.25 ozs. Indanthrene Blue BFP Double Paste
4.00 ozs. Caustic
2.00 ozs. Hydro
3.00 ozs. Dextrine

(#1)—The Caustic, Hydro and Dextrine were added to the bath at 70°F. and allowed to stand at this temperature for 2 hours. The bath was then brought to 190°F. and the color added. After standing for 30 minutes a dyeing of 2 minutes duration was made.

(#2)—This dyeing was made in exactly the same manner except that the Hydro was not added until the Caustic and Dextrine had stood for 2 hours and the bath had been raised to 190°F.

trine solution stood for two hours before use in the dyebath, losing its protective properties. The other example indicates by the addition of hydrosulfite to such solutions that the hydro buffers the alkalinity of the caustic soda, keeping it from reacting readily with the dextrine.

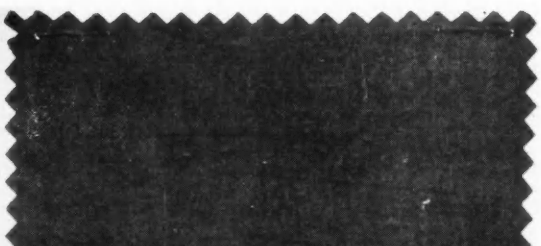
In plant application it would be important to feed cold solutions of dextrine, caustic, and hydrosulfite, rather than solutions made up of caustic and dextrine alone.

CORRELATION OF FINDINGS TO PLANT APPLICATION

Cotton Piece Goods Continuous Pigment Process High Temperature Liquid Reduction

As a large volume of yardage is produced by the above mentioned process, plant trials were run to evaluate the merits of these findings. Practical dyeings showed necessary stability was produced in strong reduction solutions sufficient to dye heavy shades of BCS types of Blue by this method.

The discovery of the phenomena of dextrine for this work gives to the industry for the first time a means of assisting and overcoming the probles of stability with Blue BCS, allowing the satisfactory production of full shades at elevated temperatures.



The photograph of the sample taken from plant production shows a full shade of blue processed continuously by the high temperature dextrine method. The pad formula contained:

13 oz. per gallon Indanthrene Blue BFP Double Paste.

1.5 oz. per gallon Indanthrene Violet 3BA Paste.

Material dried through hot flue before reduction.

The reduction bath which produced this shade contained:

Unit volume—75 gallons.
4 oz. per gallon of Caustic Soda dry.
1½ oz. per gallon of Hydrosulfite.
3 ozs. per gallon of Dextrine.
1½ gal. pad liquor added to reduction at start of run.
A temperature of 190°F. maintained.

Machine Stop

Although such shades were previously run before the discovery of the use of dextrine for stability, the operation was always considered hazardous. A short stop on the machine for mechanical troubles or cloth break-outs caused the reduction bath to disintegrate rapidly. The stability of the bath when matching in new shades is also of the utmost importance. Dyeings show effects produced, allowing a machine stop of only 15 minutes.

Dyeing #1 shows a full shade of Blue BFP Double Paste, 1 pound per gallon padded and dried. Machine stood for 15 minutes, containing the following starting concentration of color and chemicals:

.3 oz. per gallon Blue BFP Double Paste

MACHINE STOP

ILLUSTRATING EFFECT OF STABILIZATION UNDER PRACTICAL PLANT CONDITIONS.

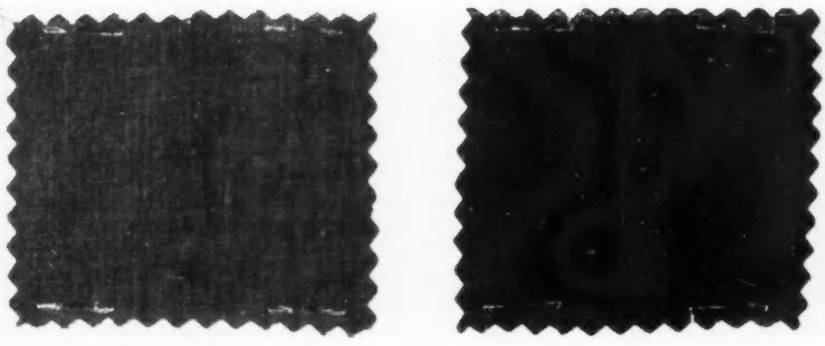
DYEINGS 1 and 2 PADDED WTH:

—Per Gallon—

1 lb. INDANTHRENE BLUE BFP DOUBLE PASTE AND DRIED.

SAMPLES RUN THROUGH REDUCTION BATH AFTER BATH STANDING FOR 15 MINUTES

(#1) (#2)



UNPROTECTED REDUCTION BATH

PROTECTED WITH WHITE CORN DEXTRINE
3 ozs. per gallon

REDUCTION BATH — 190°F.

—Per gallon—

0.30 ozs. Indanthrene Blue BFP Double Paste
4.00 ozs. Caustic Soda Dry
2.00 ozs. Hydrosulfite

4.0 oz. per gallon Caustic
2.0 oz. per gallon Hydrosulfite
Temperature 190°F.

Pigmented material passed through this bath after standing 15 minutes. Results show the reduction bath destroyed the small quantity of pad liquor contained in solution, affecting the reproduction of the true color value of the pigmented material.

Dyeing #2 carried out under same conditions, with the exception that the reduction bath contained:

3 oz. per gallon of a white corn dextrine.

Results show stabilizing action of dextrine and its behavior under practical plant operation.

Light Shades of Blue BCS Dyed According to the Dextrine Continuous Pigment Process

Practical Plant Run

The following dyeings show series of swatches taken at regular 5,000-yard intervals, incorporating white corn dextrine in the formula. You will note from the formula given that in producing shades of this depth the high temperature of 190°F. is not necessary. The lower the temperature, if full color value is produced, the more stable is the reduction bath, and the effectiveness of dextrine is thereby increased.

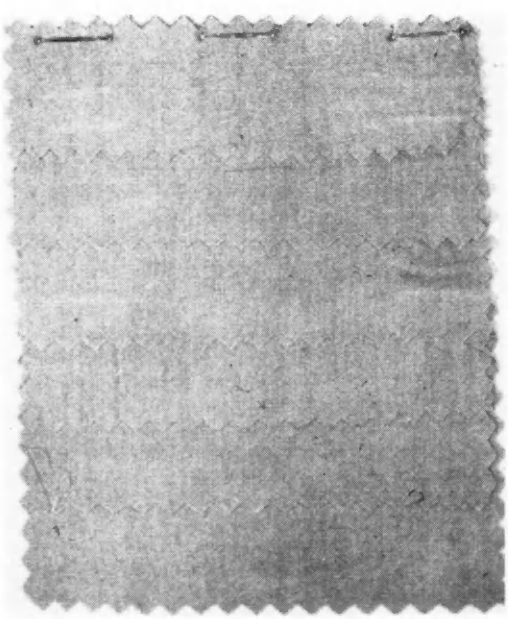
Procedure—Continuous Pigment Process Pad

1.8500 oz. per gallon Blue BFP Single Paste
.0565 oz. per gallon Orange RRT Paste
Reduction unit—75 gallons

Made up as follows:

2½ gallons pad liquor above
16 lbs. caustic soda
8 lbs hydrosulfite
9 lbs. white corn dextrine.

Temperature 160°F.



Sample at 5,000 yards

Sample at 10,000 yards

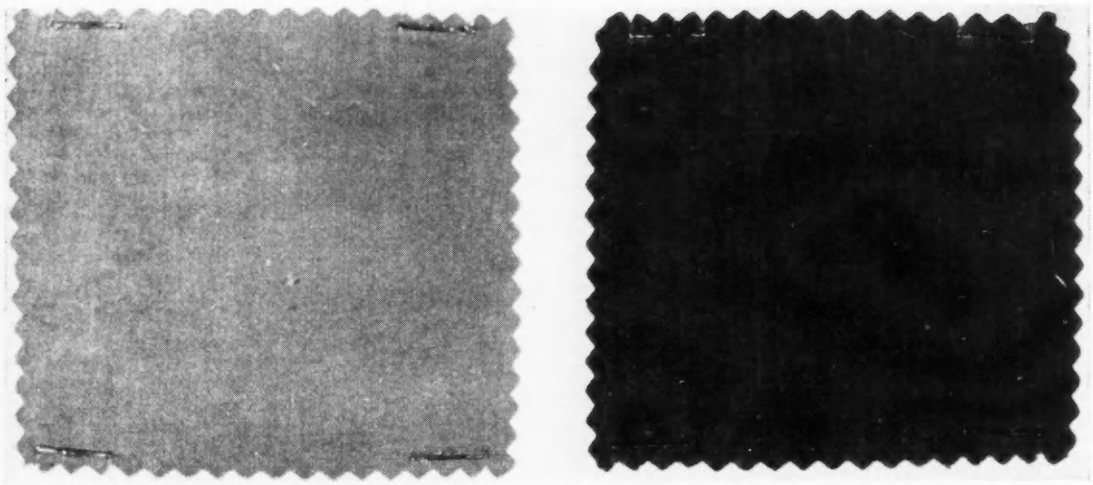
Sample at 15,000 yards

Sample at 20,000 yards

Sample at 25,000 yards

Sample at 30,000 yards

#1 #2



Action of Dextrine in Dyebath

From the results of the many trials and tests set up using dextrine in reduced vat color solution the question is asked, just what is the chemical action of this product?

It can be determined that dextrine buffers the reducing power of caustic and hydrosulfite, preventing continued reduction of the dyestuff itself. Titrations show that dextrine in dyebaths ties up some quantities of both caustic soda and hydrosulfite during the reduction period. The action, however, goes beyond the explanation given above. A dyebath that has already disintegrated by over reduction may be partially restored to produce a satisfactory dyeing by the addition of dextrine. The ability to restore to some degree a solution that has been over reduced adds to the perplexity of the explanations given so far. Further research is necessary on this particular point.

The partial restoration of over-reduced Vat Blue BCS solution is remarkable in, so far as is known, that this fact has been brought to light for the first time. Practical continuous dyeing methods proved the value of this finding by being able to restore to shade slightly over-reduced solutions by further additions of dextrine. Such additions made to dyebaths as soon as any dullness in shade was apparent during the continuous operation, bring about original restoration of shade.

Tests Showing Partial Restoration of Over-Reduced Vat Blue BCS Solution

The dyeings illustrated by photos of swatches were made as follows:

Two dyebaths were set up at 190°F. with the following:

.25 ozs. Blue BFP Double Paste
4.00 ozs. Caustic Soda Dry
2.00 ozs. Hydrosulfite Conc.

Solutions allowed to stand 30 minutes at 190°F.

Solutions were then mixed together to insure both reductions being exact.

To #2 solution was added:
3 ozs. per gallon White Corn Dextrine
To #1 solution—no addition.

Both solutions then stood for an additional 5 minutes.

Dyeings made from both solutions of 2 minutes duration simultaneously.

Results show addition of dextrine to over-reduced solution to restore to a large degree the proper shade of this dyestuff.

(See photo above)

The Value of Dextrine in the Stripping Bath

The re-working of vat color dyeings or off-shade lots has always been a major problem to the dyer. Re-reduction at high temperatures under a strong reduction potential, for the purpose of leveling or stripping color almost always affects a shade change. In most cases the effect is dulling, requiring the lot to be topped with colors other than those used in the original formula. When dextrine is used under stripping conditions, the shade is kept closer to original dyeings.

The yarn dyeings shown are samples of the value of dextrine when used in a fresh bath after stripping down under high temperatures. These dyeings were stripped identically in a package pressure machine. The original dyeings, stripped without the aid of dextrine, show upon close examination a streaky condition and that the resultant shade is very dull and red. The shade being dulled, the original brightness could not be reproduced, because of the effect of the dullness due to stripping. The dyeing stripped with the aid of dextrine is much more evenly stripped and considerably brighter than the yarn stripped in an unprotected bath.

No. 1 shows original shade of dyed lot;
No. 2 stripped by regular procedure
No. 3 stripped, using white corn dextrine as protective agent.

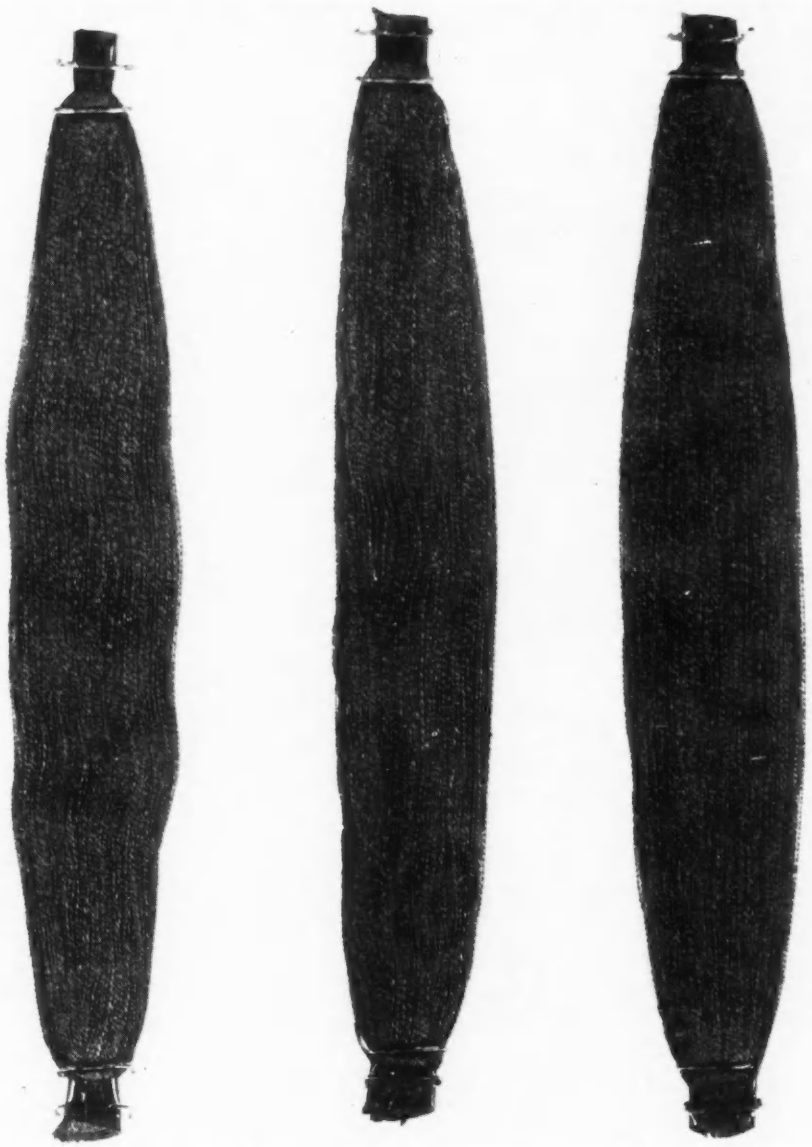
(See photo next page)

Raw Stock, Package and Beam Pressure Dyeings

Following the conclusive results from the research carried out, investigations were made immediately as to whether or not elevated temperatures might help in vat dyeing by the above mentioned methods. Many successful dyeings were carried out, incorporating the findings of these tests by increasing temperatures and adding dextrine. Mill results checked showed the following beneficial results in many cases:

1. Saving in dyeing and processing times.
2. Many shades dyed more level.
3. Greater color yield with some dyestuffs.
4. Considerable improvement in the penetration of fibers.

Aside from the advantages listed above it can be seen from the rate of flow that machine efficiency can be picked up. Flow rates are slightly increased when temperatures are elevated to between 160°F. to 175°F. The increase in rate of flow on many machines will produce dyeings more level than at the lower dyeing temperatures of 110°F. to 130°F. which are normally used in vat dyeing.



(#1)—
10% Indanthrene Blue BCSWP Powder

(#2)—
10% Indanthrene Blue BCSWP Powder
Stripped for one hour at 200°F. with
10% Caustic, 10% Hydro &
2% Peregal O

(#3)—
10% Indanthrene Blue BCSWP Powder
Stripped for one hour at 200°F.
with—
10% Caustic, 10% Hydro and
2% Peregal O
1 oz. per gallon White Corn Dextrine
(added before caustic and hydro)

Package Dyed Formula Using Hot Dextrine Method Procedure

300 pounds 30's 2-ply yarn.

The material wet out cold with:

1% Nekal NF,

which was added over three shifts of 4 minutes each.

4% Indanthrene Blue GCDWP Powder dispersed in water at 160°F.

This solution added to the machine cold over 3 shifts, 4 minute intervals each.

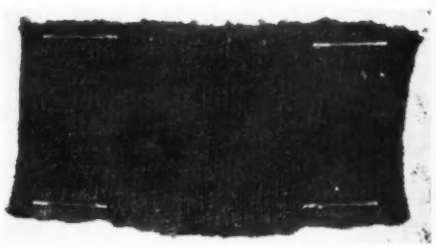
The temperature then raised to 150°F. over 3 shifts and to the machine was added

1 oz. per gallon white corn dextrine

The temperature was brought to 160°F.

The addition then made of —4% caustic and 5% hydrosulfite and the dyeing continued for 30 minutes at a temperature of 160°F. The material was then washed, oxidized, and soaped in the usual manner.

Knittings were made from the outside, center, and inside of the packages. The results show a very level dyeing.



It was evident from previous dyeings that the increase in dyeing temperature from 140°F. to 160°F., plus the protective action of dextrine, produced level dyeings not heretofore accomplished by mills which ran the above mentioned trial.

In many cases the use of retarding agents may be eliminated, as the action of dextrine does have a slight leveling effect in itself. Should retardants be found necessary, they may be used as in normal formulas. From tests run to date, no interference was noted between the action of dextrine and the retarding penetrants or leveling agents used in testing formulas.

Hosiery Dyed With Vat Colors

Many constructions of hose are best dyed at elevated temperatures in order to properly penetrate the closely woven heel and toe. The value of dextrine in hosiery dyeing has shown the same protective qualities with Vat colors when making use of high temperature dyeing operations.

The photographs show swatches which were taken from a line of hose processed with vat colors dyed by the high temperature dextrine protective method.

(See photo next page)

Procedure For Vat Dyeing Hosiery—Rotary Machines

Bath set at 190°F. with
1-2% Nekal NF (penetrant)
5% Dextrine (protective agent)
8-12% Caustic Dry.

Dispersed Vat color pigment added to bath.

Dry hose entered and run for 20 minutes.

Add ½ Hydrosulfite Conc. Run 5 minutes.

Add ½ Hydrosulfite Conc. Run 10 minutes.

Flood machine, oxidize 1-2% Sodium Perborate.

Soap at boil and finish.

NOTE:

1-2% Peregal OK used in levelling light shades and colors that tend to exhaust too rapidly.

Upon completion of exhaustive studies of Indanthrene Blue BCS, the entire range of vat colors was tested under similar conditions. Findings in many cases were as remarkable as with the Blues. Many Vat colors were unaffected, or affected only slightly, while others showed that dextrine aided in maintaining the shade of the dyestuff to its true cast. The only changes made in testing procedure for the entire range of vat colors was that the alkali content was adjusted to fit three classifications of these dyestuffs. For continuous reduction, tests were conducted using the following concentrations of alkali and hydrosulfite with the three classifications of vat colors, which were labeled as follows:

IN, or hot dyeing Vat colors
4 oz. caustic per gallon
2 oz. hydrosulfite.

IW, or warm dyeing Vat colors,
2 oz. caustic
2 oz. hydrosulfite .

IK, or cold dyeing Vat colors
1 oz. caustic
2 oz. hydrosulfite.

Note the only change in procedure was an adjustment in the caustic content.

There are a few vat colors that do not fit either of the above mentioned three classifications. In such instances special formulations should be used.

The following tests represent a few of the vat colors in the different dyeing classes. *(See photos following)*

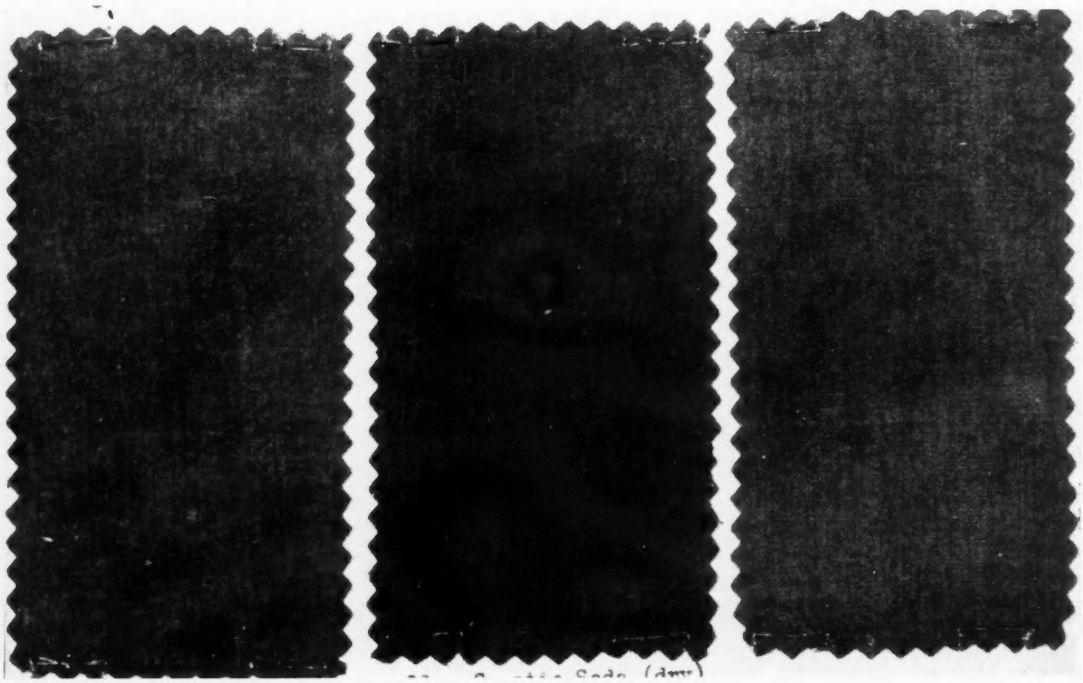
In the near future a color chart will be released, showing the entire vat color range tested in conjunction with dextrine.

INDANTHRENE BLACK BROWN VA PASTE (IW)
0.25 ozs. per gallon
STABILITY TESTS @ 190°F.

2 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION DEXTRINE ADDED AT TIME OF REDUCTION



2 ozs. per gallon Caustic Soda (dry)
2 ozs. per gallon Hydrosulfite
3 ozs. White Corn Dextrine

NOTE: The addition of dextrine aids in maintaining the proper shade of the dyestuff.

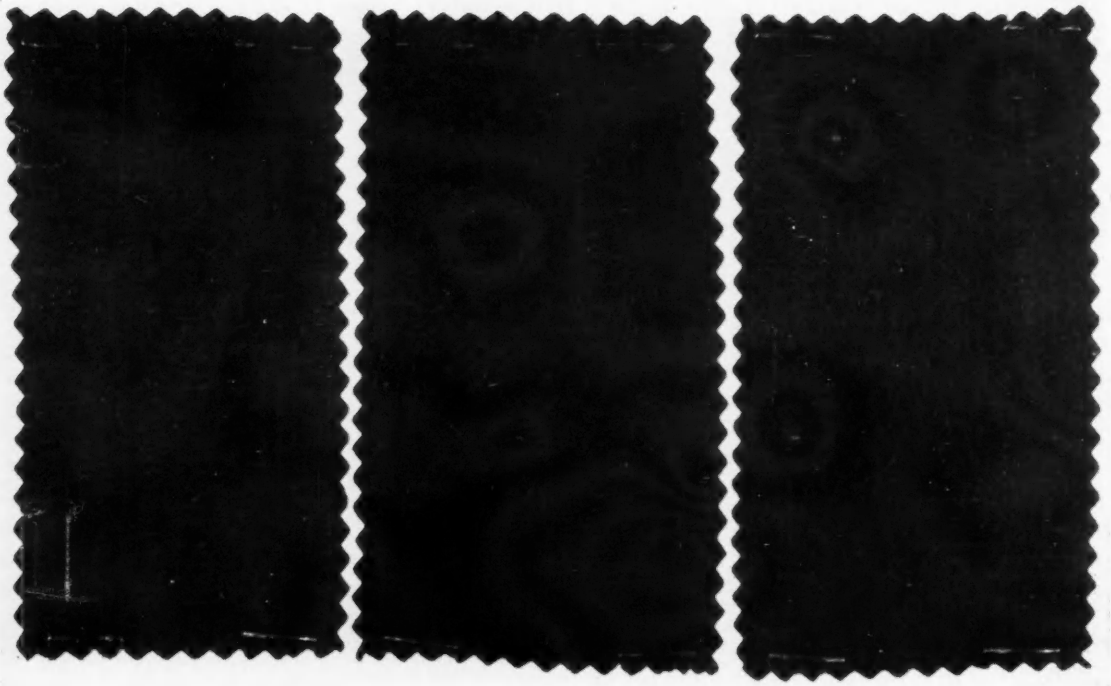
HOSIERY SHADES DYED BY THE HIGH TEMPERATURE DEXTRINE METHOD

INDANTHRENE OLIVE GREEN BA DOUBLE PASTE (IN)
0.25 ozs. per gallon
STABILITY TESTS @ 190°F.

2 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION DEXTRINE ADDED AT TIME OF REDUCTION



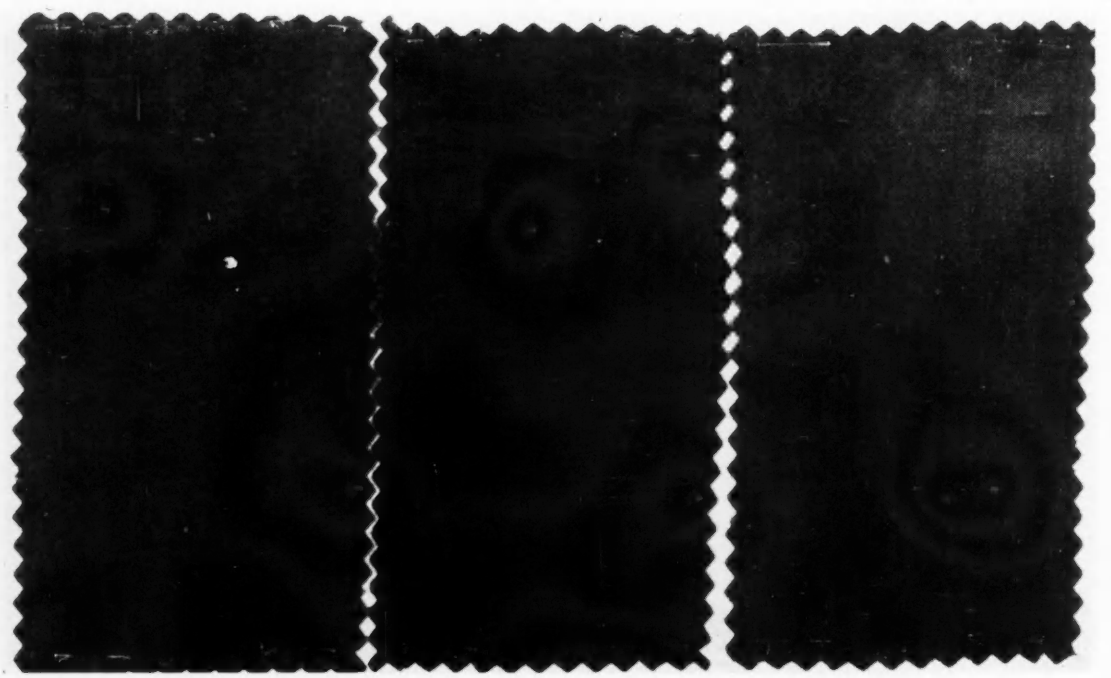
4 ozs. per gallon Caustic Soda (dry); 2 ozs. per gallon Hydrosulfite; 3 ozs. White Corn Dextrine.
NOTE: This dyestuff shows stability without the aid of Dextrine.

INDANTHRENE VIOLET FFBNA PASTE (IW)
0.25 ozs. per gallon
STABILITY TESTS @ 190°F.

2 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION DEXTRINE ADDED AT TIME OF REDUCTION



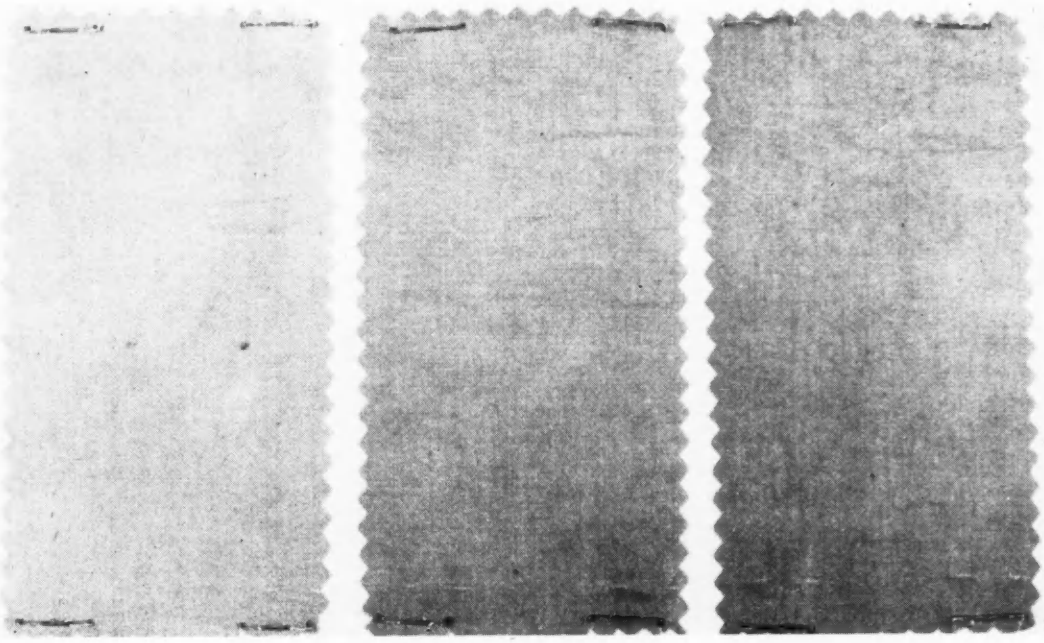
2 ozs. per gallon Caustic Soda (dry); 2 ozs. per gallon Hydrosulfite; 3 ozs. White Corn Dextrine.
NOTE: This dyestuff shows stability without the aid of Dextrine.

INDANTHRENE BROWN RAP DOUBLE PASTE (IW)
0.25 ozs. per gallon
STABILITY TESTS @ 190°F.

2 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION DEXTRINE ADDED AT TIME OF REDUCTION



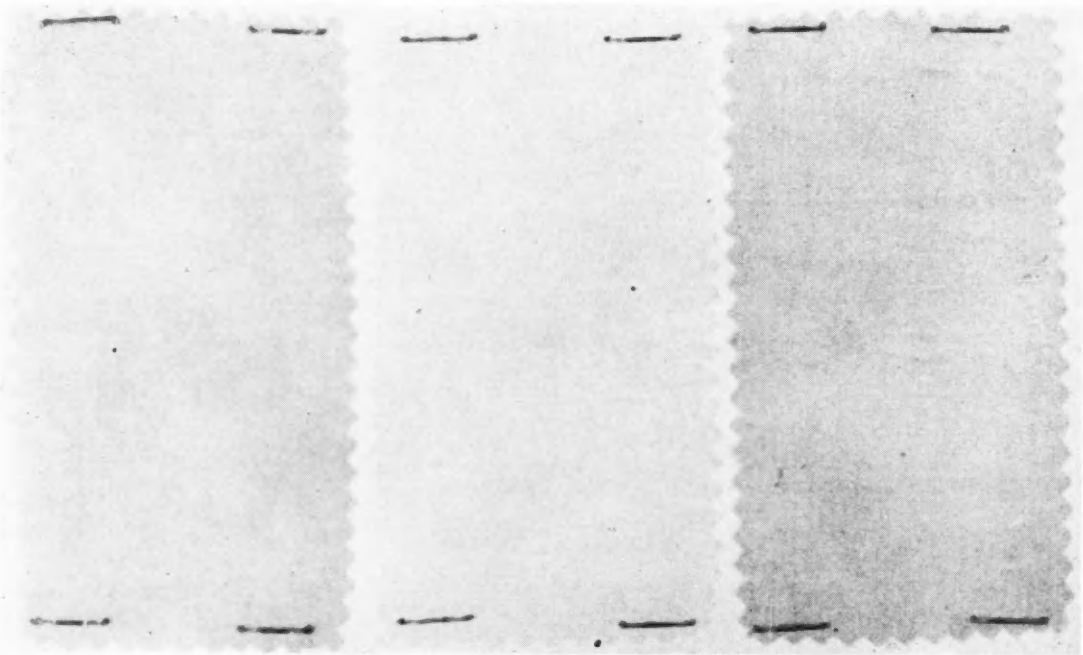
2 ozs. per gallon Caustic Soda (dry)
2 ozs. per gallon Hydrosulfite
3 ozs. per gallon Dextrine (white corn)

INDANTHRENE BRILLIANT ORANGE RKA PASTE (IK)
0.25 ozs. per gallon
STABILITY TESTS @ 190°F.

2 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION DEXTRINE ADDED AT TIME OF REDUCTION



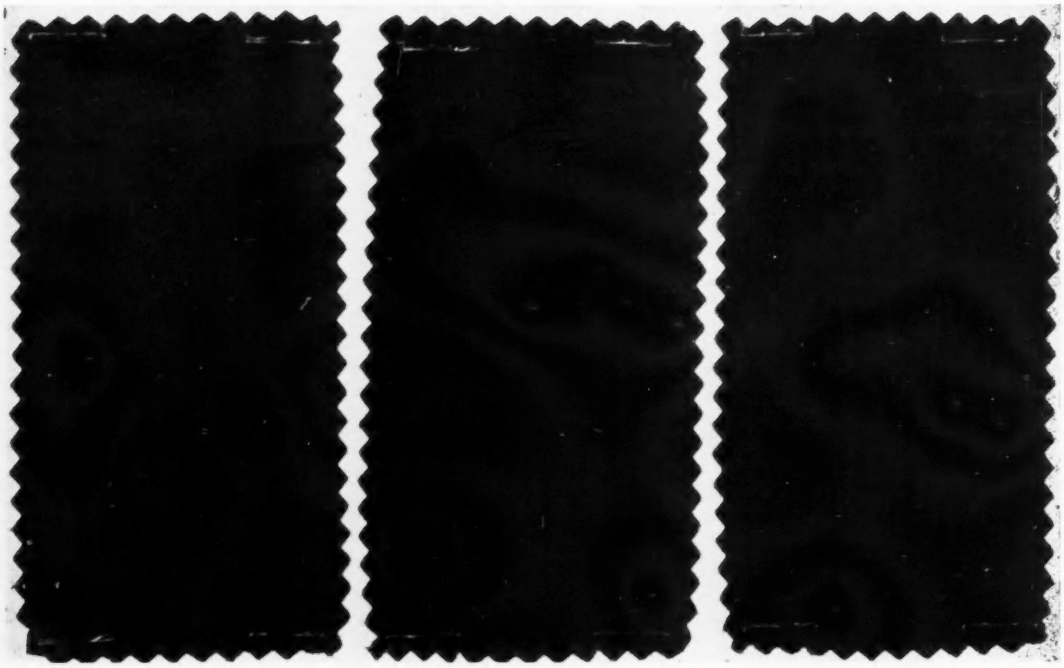
1 oz. per gallon Caustic Soda (dry)
2 ozs. per gallon Hydrosulfite
3 ozs. per gallon White Corn Dextrine

INDANTHRENE BRILLIANT VIOLET RRA PASTE FINE (IN)
0.25 ozs. per gallon
STABILITY TESTS @ 190°F.

2 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION DEXTRINE ADDED AT TIME OF REDUCTION



4 ozs. per gallon Caustic Soda (dry)
2 ozs. per gallon Hydrosulfite
3 ozs. White Corn Dextrine

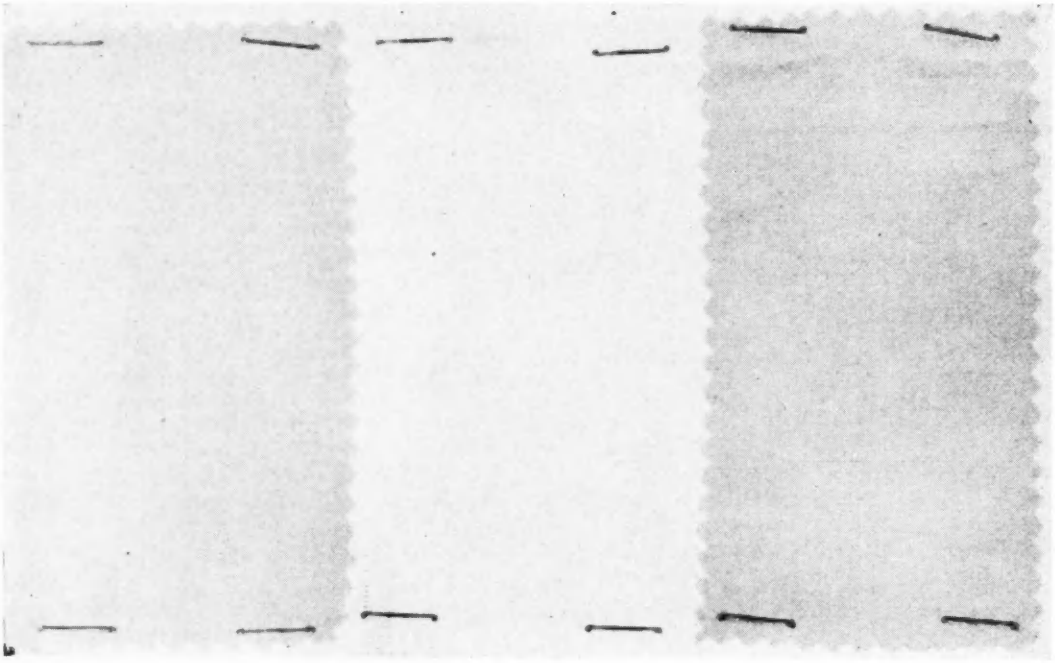
NOTE: The addition of Dextrine aids in maintaining the proper shade of the dyestuff.

ALGOL ORANGE RFN PASTE (IN)
0.25 ozs. per gallon
STABILITY TESTS @ 190°F.

2 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION

30 MINUTES AFTER REDUCTION DEXTRINE ADDED AT TIME OF REDUCTION



4 ozs. per gallon Caustic Soda (dry)
2 ozs. per gallon Hydrosulfite
3 ozs. per gallon White Corn Dextrine

Summary

To summarize this investigation, the following points represent the major developments of this work:

1. The discovery of dextrine as an aid to stabilization of reduced vat color solutions.
2. The determination by alkali labile number regarding the protective properties of dextrines.
3. The value of the protective action of dextrine with vat colors other than BCS Blues.
4. A testing method developed to determine the proper reduction of vat dyestuffs when dyed by continuous processes.
5. Hydrosulfite Conc. Powder being the most suited reducing agent, a need for a more stable hydrosulfite when working at elevated temperatures, 190°F.-200°F.
6. The alkali studied indicated sodium and potassium hydroxide as being about equal with respect to the proper alkali to be used for reduction purposes, both being superior to the carbonates of sodium and potassium and tri-sodium phosphate.

These findings give to the art of dyeing greater flexibility in vat color application by adding new factors to the science of Vat color reduction.

Practical plant trials, using many different dyeing methods, have proved the value of the information uncovered in this search.

—◆ ◆—

Meeting, North Carolina State College Student Chapter

ON January 26th, 1949, Henry H. Latham and James M. Leach of the Morton Chemical Co. addressed the North Carolina State College Student Chapter on "Detergents." Twenty students and instructors were present.

Respectfully submitted,
JOSEPH R. STILLWELL,
Secretary.

Research Highlights

DIMENSIONAL CHANGES IN WOVEN WOOLEN FABRICS

AATCC has accepted a new tentative testing method which is equivalent in effect to three or four standard commercial wool launderings. This method will be improved by further study before it is submitted for approval as a standard method.

Membership Applications

STUDENT

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John R. Godet, Lowell Textile Institute. Sponsor: E. E. Fickett.

Raymond E. Halligan, Lowell Textile Instituee. Sponsor: E. E. Fickett.

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(Concluded on Page P239)

South Central Section—

NAPHTHOL DYEING AND PRINTING*

R. H. NUTTALL
American Aniline Products, Inc.

OVER an experience of several years in dyeing and printing of naphthols it has been interesting to note the procedures used in different plants, each solving its local problem in what it considered the best way only to arrive at the same result.

There are, however, some principles which must be followed to get best results and regularity, not only in shade but in fastness to crocking and bleeding.

Package Dyeing

The first procedure is the boil off. Many feel that wetting out with water alone at 190 to 200°F. is sufficient, but I believe that in dyeing cheeses, packages, and hosiery a boil off at 190 to 200°F. using a good wetting out agent is beneficial in cleaning and preparing the package for spring bath and subsequent naphtholation. Following this boil off, I think it a good idea to drop the bath and give a hot water wash at 160°F. for ten minutes, then cool to 110°F., ready for the spring bath.

From my experience, it is good practice to use the same amount of caustic soda as Naphthol AS-SW; for example, 2% AS-SW on a 600 lb. package would be 12 lbs. AS-SW and 12 lbs. caustic soda. Dissolve the caustic soda in one container and mix the 12 lbs. AS-SW in another with sufficient alcohol to make a smooth thin paste. Add the caustic to the AS-SW but only in sufficient amount to put the AS-SW into good solution. To further insure this add also 1 pail of boiling water to the naphthol. The rest of the caustic soda can now be added to the expansion tank for the spring bath. Run 10 minutes at 110°F., then add the dissolved naphthol slowly, stirring all the time. It is helpful to add the naphthol solution in two equal portions. The addition of salt to the naphthol bath, usually about 10%, is better in three portions, so that the salt will not throw out the naphthol. If the whole 10% is added at one time, there is immediate throwing out of naphthol in the expansion tank. Then the naphthol is blamed for resultant bleeding, crocking and dusting off in the finished dyeing.

As to the salt wash, 30% salt being a good average, I find that the addition of .2% caustic is advantageous, since many plants have water with low pH. I had one experience with a low grade salt having considerable free acid content which threw the naphthol completely out of solution. This small percentage of caustic is a good safeguard.

It is also helpful to use a little ice in the salt wash, since the cooler you get your naphtholated packages before coupling, the better. Once the inside and outside of the package were dyed all right but the middle showed crocking and bleeding. I tried various means of remedy and finally overcame the difficulty by using ice in the salt wash. I attributed this to the colder salt wash cooling the interior of the package to give more uniform temperature and coupling through the package.

After the salt wash drop, and when ready to add the coupling bath, either salt or base, fill the machine with 150 lbs. of ice cold water, and 1 - 10% salt with either color salt or base.

In the preparation of color salt, weigh the salt and place in a 50 gallon wooden barrel. Mix 1% of a product such as Stabilon with 10 gallons of cold water and mix this into a paste with the salt. Then add slowly, stirring all the while, 20 gallons more of cold water and 50 lbs. ice. Let stand 20 minutes until clear, and add ½ gallon acetic acid (56%), just before delivering with ice and salt and water to the expansion tank. Run 30 minutes at temperature not over 60°F.

When using color base instead of salt, the procedure is different. To the paste of color base with such a product as Stabilon hot water at 200°F. is added, then hydrochloric acid. Stir until clear, then add ice to bring down to 35 40°F. and slowly add nitrite of soda. It is imperative that the nitrite be added very slowly to get the best diazo solution. If diazotized too quickly, the base may be thrown out of solution and have to be thrown away. A slowly diazotized base shows up cleaner and better in the ultimate dyeing. Neutralization of the diazo solution has to be done carefully, with about 1% sodium acetate. Make a solution and add very slowly to the diazo solution until just neutral to congo red paper. It has been found that too rapid addition of acetate to diazo solution causes precipitation, or affects the fastness of the resultant shade.

It might be here noted that with Fast Red Base, and Fast Bordeaux GP Base, a reverse procedure is adopted, in that the sodium nitrite is mixed with the bases first and the hydrochloric acid is added. The same low temperature must be observed to obtain good diazotization. In order to help removal of excess color lake, small quantities of Stabilon in the developing bath are an advantage, 3 pints to 50 gallons of developing bath. This product is useful for dissolving the fast color salts, and it helps in the developing bath in that it keeps excess color lake in better dispersion, so that it is more easily removed in subsequent washing. In the case of Fast Garnet GBC Salt it is not advisable to add common salt to the developing or coupling bath, as it hurts stability of the solution.

Washing is varied, but good washing will not make a bad dyeing good, or eliminate crocking and bleeding, the two great evils in naphthol dyeing. A product such as Stabilon does work wonders, however, in eliminating the effect of faulty dyeing on after washing.

The above remarks refer to beam dyeing also, except that it is better to use bases than salts on a beam, with solution probably a little lower in solid content and not as liable to blow a beam.

Rawstock Dyeing

In rawstock dyeing, as you know, the use of fast color salt is out of the question. Only bases are used, so that carding and drawing in may be done with minimum difficulty, in view of the fact that dyeing of any naphthol on rawstock gives harshness to the stock. The minimum amount of base for coupling with the naphthol used is important to reduce to a minimum the harshness produced by naphthol dyeing and to facilitate the after processing, especially carding and drawing in.

I had to do some rawstock dyeing with a combination of napthol AS-SW—AS-SG and Fast Red KB Base. I set up my formula for a 50 lb. machine before going over to the large machine. My first dyeing with equal parts naphthol and

* Presented at Meeting, South Central Section, December 4, 1948.

base was difficult both to card and to draw in. I then tried the proportion 8 parts naphthol to 7 parts base, between dyeings I prepared filter paper with the naphtholate, dryed and used it in strips as an indicator. With the ratio 8 to 7 naphtholated paper still showed an excess of base. This dyeing carded better but was not good on the drawing in frames. I did one more dyeing, using the ratio 16 parts naphthol to 12½ parts base. At the end of coupling this still showed a little excess base in test with naphtholated paper. It carded well and worked well on drawing in frames.

Might not naphtholated paper be used regularly to indicate excess salt or base in the coupling bath at the end of process? There has to be an excess, but errors in weighing must be prevented. Such may be responsible for bleeding, crocking and excess harshness, though the naphthol, salt, or base may take the blame.

Hosiery Dyeing

As to hosiery dyeing, the procedure is of course somewhat varied. General principles in dissolving the naphthol, salting, and preparation of the salts and bases are the same. Following is the general procedure.

To complete a range of vat shades that will stand the most severe wash fastness tests, and obtain brightness requirements along with fastness at not too high a price it has been necessary to use naphthols on the bright red and maroon shades.

Through practical experience in hosiery dyeing, it has been found that formulae for particular shades must vary according to the volume of water as well as weight of goods. Careful attention must be given to weighing, time limits, and temperatures. Evenness and level dyeings are constant if these be given proper attention.

The following procedure, to produce a red shade accepted by a number of hosiery mills in the South, is for 50 lbs. mercerized hose on regular 50 lb. Smith Drum or Venango enclosed rotary machine.

Fifty pounds mercerized hose are loaded in the machine and wet out for 10 to 20 minutes at 210° F. with 1% penetrant; then dropped.

Spring Bath: Bring up low volume bath. Add 1¼ lbs. caustic previously dissolved to the machine and raise temperature to 130° F. Run 10 minutes.

Naphthol: Paste thoroughly 1½ lbs. Amanil Napthol AS-SW, carefully avoiding lumpiness, with three quarts of alcohol. Dissolve in one quart of water containing 8 oz. dissolved caustic. Add slowly and stir until solution turns a dark brown. Add a pail of boiling water to insure complete solution. Add naphthol to machine in two portions over a period of 10 minutes. Some dyers strain the naphthol into the machine through cheese cloth, so that undissolved particles will not get into it.

Run the naphthol 20 minutes at 130° F. Add 5 lbs. common salt brine in two portions. Run 20 minutes longer. Drop. Give two cold salt washes.

First Salt Wash: 15 lbs. common salt brine and 2 oz. caustic flakes. This is one phase of naphthol hosiery dyeing which must be handled very carefully. While machine is being filled to the axle, no water can be poured on naphtholated hose because spottiness and unevenness will result. Water must be brought up slowly to avoid this, especially in machines which water enters from the top. Run salt wash 10 minutes. Drop.

Second Salt Wash: Repeat first wash. Drop.

Coupling Bath: Paste 4½ lbs. Fast Ponceau L Salt thoroughly and dissolve in a mixture of 3 gallons cold water with ½ pint Stabilon. The Stabilon helps solution of the color salt and renders the solution more stable. The solution should be allowed to stand 15 to 20 minutes, then strained into the machine along with 4½ lbs. of common salt brine. Run 30 minutes cold. Drop.

Finish as follows: Give one cold rinse, 5 minutes. Drop. Give one hot rinse 140° F., 5 minutes. Drop. Give one hot Stabilon rinse—one pint Stabilon—160° F., 10 min. Drop. Give one hot soaping 190° F., 15 minutes, with one lb. neutral soap. Drop. Give two cold rinses. Drop. Pull.

This procedure has proved satisfactory in all hosiery mills where naphthol red shades were required.

Piece Goods: Naphthol dyeing on piece goods is a little more varied. You can naphtholate the goods with non-substantive naphthols such as Amanil Napthols AS-OL, AS, AS-D, AS-BS, and AS-RL which is slightly substantive. Dry and couple on a continuous machine as the Williams or duPont.

Another method is to apply the substantive naphthol on the padding machine, batch up wet and take to jig, salt wash and couple. Amanil Napthols such as AS-SW, AS-BR, AS-S, AS-SG, AS-TR, and AS-BO can well be used for this method. Then there is the method of naphtholating and coupling on the jig for which the substantive naphthols are used. Whenever in naphtholation, either on padder or jig, naphthols of different substantivity are used, higher temperatures are necessary to assure regularity. Much has been said about proper pH of coupling bath on piece goods, or for that matter any coupling bath. I think pH 4 to 5 is good. If after coupling two ends of piece goods on the jig your solution remains clear and fluorescent, your dyeing is good. If it assumes a muddy appearance your dyeing is ruined. You will get bronzeness of dyeing and pH of 8 to 9 will show alkalinity.

Printing of Naphthols

In naphthol printing only the non-substantive naphthols are used, with exception of Amanil Napthol AS-BS which is only slightly substantive. Amanil Napthols as AS, AS-D, and AS-BS are prepared on a padder with hot flue drying attachment, dried and batched up for printing. In printing it is necessary at all times to have an excess of naphthol over salt or base. If not, you will get bleeding of colors during after-soaping. Multi-color work can be done by this method, since you can print blue, orange, red, marcon, and chocolate all at one time on the same naphtholated cloth.

The thickeners generally used with color bases and salts are principally gum tragacanth, locust bean meal and corn starch. Great care must be exercised that the temperature of these printing colors be kept as low as possible, lest decomposition set in and thickener disintegrate. It might be added that the resin clears such as used by Aridye and Sherdye in pigment printing can be used to advantage as medium for thickening naphthol colors. This is particularly true where fine definitions and unbroken lines are desired in heavy shades. It is common practice to print naphthols and pigments alongside each other in multi-color print patterns.

The old I.G. always recommended use of common salt in the coupling bath both for salts and for bases. The present trend is to leave common salt out of the coupling bath, particularly with fast color salts which are already fairly well loaded with substances added to preserve them.

In concluding I should like to speak about washing and cleaning up naphthols. The use of 2% Stabilon at 190° F. is excellent for removing excess color. Having pH of 4 to 5, it does not cause crocking and bleeding as sometimes with soap and other products. A Stabilon wash followed by a hot wash with formic acid at 150 to 160° F. gives better crock fastness and less bleeding both on piece goods and package work. After the formic acid wash a couple of good hot water rinses are all necessary before finishing off.

The opinion is growing that after the Stabilon wash subsequent washes with soaps, soda ash, or other detergents do not help crocking and bleeding. Even with repeated washings the crocking does not materially improve. The use of formic acid is more helpful.

New York Section—

A QUALITY BLEND MAKES SUCCESSFUL SALES*

J. R. PRICE

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FOR the past two years, the sales of plastic consumer merchandise have taken on a new, more pleasant color. This is a healthier color, for the market has a new vitality and a new hope for the future. It is no longer sick with hysteria—hysteria born of the war by a triumvirate of anxious consumer, manufacturing opportunist, and over-exuberant writer. The consumer has learned to recognize value and is more discriminate in his buying; the retail buyer, also an actual consumer, has become alerted to the pitfalls surrounding the merchandising of plastic products, and is making sure that he is not overstocked with inferior merchandise that cannot be sold; the manufacturing opportunist is either out of business or, by necessity, more careful in his fabrication, since he realizes that the market will not buy just anything any more; the casual writer who emphasized dream castles for the post-war-conscious consumer is now virtually extinct, no longer presenting plastics in the light of fantasy but discussing them in factual, informative terms.

The picture therefore has changed with a new enlightened triumvirate consisting of informed consumer, conscientious manufacturer, and factual writer; the malady has been cured and the market has been restored to health. Now, the cure for this sickness is, like all good prescriptions, the result of a successful blend. This blend itself is triune consisting of three important ingredients: *cooperation, product research and control, and factual information.*

Manufacturers are now cooperating to produce a quality product, both in plastic semi-raw materials and in the final consumer plastic merchandise. They are maintaining that quality with extensive laboratory research and effective production control . . . and, they are publicizing that quality by means of carefully coordinated advertising and sales promotion programs. These advertising and sales promotion programs, directed toward the retail buyers as well as the public are producing an informed consumer. Thus, there is a knowledge of plastics arising above popular misconceptions. They are no longer being considered as fictional materials of fantasy and fragile quality; instead they are being relied upon as materials of durability and utility.

Cooperation has become the keynote to the successful relationship between raw material manufatcurers and fabricators because, as a wise old gentleman known as Benjamin Franklin once said, we have learned that, "If we do not hang together, we will most assuredly hang separately." Thus, there is a ready transfer of helpful technical information concerning fabrication techniques and compounding formulation. We know that in the past the layman blamed plastics as a whole for the inferior fabrication techniques of a few. Despite raw material manufacturer recommendations, the manufacturing opportunist did not consider the working qualities of the material and produced articles that were, in the main, "cut-stitch" propositions. Thus, he did not heat seal the material nor did he use special equipment required to fabricate it.

In addition, improperly compounded material resulted in much of the dissatisfaction of buyers, sellers, and users of plastic articles. The structure of plastic materials is such that only a careful chemical balance can assure a high quality material. For example, Vinylite Brand plastic film and sheeting are produced by first carefully combining basic Vinylite Brand resin with plasticizer, stabilizer, lubricants, and pigment in an effective mixer. Now, while the material was originally four separate ingredients when it entered the mixer; heat, pressure, and mixing causes the four ingredients to combine into a plastic mass and become one inseparable material.

The material is then milled to further homogenize the plastic, and it is then charged into a calender, a huge unit consisting of several rolls, between which the material passes. As it leaves the calender it is finished film material, which can be printed or fabricated into such items as shower curtains, draperies, rainwear, and a multitude of other applications.

Here, "pinpoint" formulation and production are the result of careful blending and control. Film and sheeting, both made from the same basic resin and produced in the same manner, differ mainly in thickness, the sheeting being thicker than the film . . . but, and this is virtually important, they may also differ in formulation depending on the specific use for which they are designed. However, in the past, certain manufacturers, producing their own material, did not formulate the material properly for a particular end use. With such faulty, unchecked compounding there is lubricant exudation, plasticizer migration, and poor color stability. Thus many plastic film and sheeting materials of dubious quality, which appeared in fashion and home accessories, developed a rancid odor, fading color, and tacky or "boardy" condition after a period of service. This type of manufacturer, in combination with others fabricating products from scrap material, almost ruined the market.

For example, one manufacturer possessed 300,000 yards of a plastic material from which he expected to produce among other things, approximately 100,000 handbags. Incorporated in this material was a plasticizer known to be of high extractibility. Unfortunately if the finished handbag were placed on furniture, this plasticizer would soften the furniture finish. Thus besides possessing an inferior quality handbag, the owner would also possess a discouraging furniture repair bill and a very poor impression of plastic products.

Today, fortunately, this type of "Big-time" glaring opportunism has almost disappeared. I say *almost* because there are still a few manufacturers cutting corners.

Cooperation, however, has done much to clean out this type of detrimental influence to the industry . . . and, joining the raw material manufacturer and fabricator in cooperation, there is now an important third party, the manufacturer of colorants. For plastics, while materials of utility and durability, must also be materials of beauty.

It is an age-old axiom that color catches the eye . . . thus, it is not strange that

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color plays an important role in the production of plastic film. Forty per cent of all film produced by Bakelite Corporation is produced in color. Out of the remaining sixty per cent, eighty per cent receives color treatment by printing. Thus, with 40 per cent of our production being colored film, and 48 per cent receiving colored treatment later, the use of color in plastic consumer merchandise is widespread. It is now a recognized fact that color is an important selling point, an important component producing a blend of quality, beauty, and durability. Here, then, color manufacturers and printing converters have participated greatly in increasing the sales of consumer film and sheeting.

After it was recognized that film and sheeting could be widely adaptable to any decorating need because of a broad color range, it was found that standard colorants were not suitable for formulation. Thus, extensive research by color manufacturers produced pigments and dyes that stood up as long as the film would last, providing permanence against weathering, heat, and light. The problem of suitable colors was twofold, including processing and service. A suitable color not only had to remain stable in processing because of the high temperatures involved, but also remain stable in hard, everyday service.

Now research has availed us of these colors to such an extent, that the standards we in Bakelite Corporation use today for judging the suitability of colors are far above general industry standards. Our exacting standards are approximately ten times greater than those required by industry. In some phases of the textile industry, exposure of 40 to 80 hours duration in an accelerated weathering unit is considered satisfactory. However, our standards have increased from 250 to 1,000 sun hours depending on the blend of resin and type of colorant used. Certain standard materials will last even 1,500 sun hours, equivalent to one year Florida exposure.

Extensive product research has shown us that in order to obtain these high standards, both pigments and dyes must be used in our formulations, depending on economy as well as quality. These high standards are maintained by constant checking with spectrographic equipment and other complex laboratory tests, thus leaving nothing to the faulty judgment of human senses.

According to our production ratio, the colors red, blue, and green, seem to be the most desired colors, with yellow also in wide demand. Our basis for producing a majority of film and sheeting in these and other colors is arrived at by manufacturer preference. These requirements are set up by our customers in fashion and home fields who have determined the choice of colors by consultation with retailers. These customers submit samples, and then we match the samples for color.

An important new development affecting the use of colorants in the formulation of plastic consumer merchandise concerns metallized film. This new sales stimulant was developed by Bakelite Corporation and introduced to the market in January 1948. Almost immediately there was a widespread acceptance of this material by manufacturers, retailers, and consumers. Its greatest influence has been in the rainwear and closet accessories fields since it now gives designers a new medium with which to work. Its acceptance has been so great that for us it has meant a constant production of this material since January. There is no end in sight to the growing use of metallized film. Thus it presents another means of increasing the growing relationship between the colorant manufacturer and plastic raw material manufacturer, since all types of this material have colorants plus special aluminum particles in their formulation.

As previously mentioned, we have found that 40 per cent of film produced by us receives some form of color treatment. This can be directly attributed to the development of satisfactory vinyl printing inks. Just as ordinary writing ink is not suitable for printing newspapers nor is newspaper printing ink suitable for printing on smooth or calendered paper, conventional inks are not successful in the printing on vinyl film. The answer to this problem was in the development of special printing inks containing a Vinylite resin base which would be compatible with the film material.

The amount of pigment present in vinyl inks is of a much higher concentration than ordinary printing inks. This is essential since opacity must be obtained for the thin layer of ink which is deposited. That success has been achieved in the use of vinyl printing inks is evidenced by the fact that with proper formulation the print actually becomes part of the film. Printing inks have done much to spur the sales of vinyl films. They have made possible unlimited patterns and designs in infinite colors for the decorating of film materials. Using basically the same type of inks, artists are hand painting film materials for bed spreads and shower curtains, and in these colorful household accessories their imaginations have roamed over the horizons of design. Fresh-looking floral designs that rival nature in their coloring appear in glowing, lasting colors. They bring a classic beauty to household interiors.

"Two-toning" is one development that has become very popular. Beautiful and striking designs may be obtained by coating with one color, and then embossing and high lighting with a different shade. Thus, designers now have the free use of color to combine with the inherent beauty of the plastic film itself.

This brings into the picture another important force in the growing sales of vinyl materials. The processes for embossing and casting, for example, have become increasingly important in imparting textilized surfaces to vinyl materials. Occasionally we have had comments from consumers that they have only the criticism of plastic consumer merchandise. . . and that criticism is that they *look* plastic. Thus we find that many people do not care to use draperies in their living rooms and bed rooms but will only use curtains and shower curtains in their bathroom or kitchen for the excellent durability properties of the material but not for its de luxe appearance.

Now that plastic materials can be given any desired surface texture, this problem has been remedied and entirely new fields of application will be reached. The consumers will have all of the excellent service life properties of plastic material plus the surface appearance of their favorite fabrics to blend with the most discriminating decorating schemes. Thus, such a development will mean a large volume increase in the sales of plastic film for such home applications as draperies.

These new developments, initiated by Products Research, mean a high quality consumer article when coupled with product control. The exacting formulation of Vinylite Brand plastics is maintained by thorough testing in Bakelite Corporation laboratories. For example, a sample of each roll of Vinylite plastic film in production at our plant will be sent to the control laboratories. It will then be subjected immediately to rigorous testing. If the sample fails to pass specifications, the roll will not be shipped. Thus, all of these tests are conducted with one purpose in mind. They are a constant guard to the uniformity and durability of the material finally presented to the manufacturing fields. Thus a manufacturer is assured that these materials are colorfast, waterprof, mildew-resistant, tasteless, odorless, and non-toxic, slow-burning or non-flammable, resistant to oil, alcohols, and most chemicals, and resistant to peeling, scuffing, and crazing.

To assure that this quality in raw materials is backed up by quality in the end product, the finished samples of products made from these materials are submitted to the Better Fabrics Testing Bureau for further testing. These tests then

(Continued on Page P238)

South Central Section—

EVALUATION OF LEVELING AGENTS

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ALTHOUGH dyestuff manufacturers indicate which of their dyes are best suited for any dyeing process from the standpoint of level dyeing, it is not always possible to use them because of price, wash fastness, etc. Then, too, the majority of dyes are said to come up unevenly, these dyes not being confined to any one class*(23)*. The judicious use of leveling agents should prove of value to the dyer, but he needs one or more accepted methods for accurately evaluating these textile auxiliaries.

It is obvious that a dye in the aqueous phase cannot dye a fiber until that aqueous phase has actual contact with the fiber. Penetration is thus important in obtaining level dyeing results even if it is a phenomenon separate from retardation. The best test for penetration undoubtedly is a practical wetting test. such as that of the AATCC*(5)*.

If an agent does more than merely cause better wetting and hence better penetration of dye liquor into the fiber, there must be devised methods for evaluating its leveling action. It is felt that if affinity between dye and fiber is very great, exhaustion will take place on those fibers most accessible on the outside of fabrics and yarns, resulting in poor penetration and levelness. A true leveling agent should slow down the rate of exhaustion so that dye molecules can reach less readily accessible fiber surfaces*(5)*. The mechanism of level dyeing effects on wool and on cotton may be very different.

It should be emphasized that the dyer uses methods, other than chemical methods, to accomplish the same objectives obtained by the true retarding agents*(5)*. These are as follows:

(1) Control of temperature initially to a value where the exhaustion rate is slow, as for example, dyeing below 90°F. with the warm dyeing vat dyes.
(2) Addition of dye at intervals.
(3) Control of movement of dye liquor with respect to fiber surface.

Although the literature contains little, if any, information regarding the actual evaluation of leveling agents, there are valuable references concerning the use of these agents as well as the causes and prevention of uneven dyeings.*(8-19)*

Clark*(25)* observes that leveling assistants may be of value in producing level dyeings with recalcitrant colors but their use should be kept at a minimum since they produce their effect by retaining dye in the bath. He offers several curves illustrating the effect of temperature manipulation and of leveling assistants on the rate of exhaustion. Exhaust curves are also offered showing the effect of sodium lignin sulfonate or glue to the dyebath.

Reis*(26)* states that Glauber's salt acts as a leveling agent with acid dyes on wool while sulfonated alcohols retard wool dyeing with direct dyes, as with vat colors. The slower the dyes go on, the better the penetration will be. It should be observed that alkylaryl sulfonates and sulfated (not sulfonated) alcohols both tend to exhaust on wool, slowing the strike of acid, direct and vat dyes on wool.

Millson, Royer and Wissemann*(24)* have made microscopic studies of fluorescent dyes to learn more about the phenomena of dye penetration. Brilliant Sulfo Flavine FF was found to be a level dyeing dye with no fiber selectivity whereas Sulfo Rhodamine BG not only has fiber selectivity but shows non-uniformity of penetration within the same fiber. Experiments show that the leveling of dyes varies greatly over different time cycles, for example, Calcocid Orange Y may be level and penetrate well in 15 minutes of boiling while other dyes must be boiled 6 or even 12 hours to equal the levelness of this particular dyestuff. Many widely different factors influence the leveling of a dye: the solubility of the dye and type of aqueous dispersion it gives (i.e. colloidal, large particles and aggregates or small particles and true solution) is of prime importance.

Smith*(21)* observes that there is no evidence in the literature to support the popular conception that surface-active agents act as leveling agents in the dyebath by a dispersing action of the dye. The positively charged surface-active agents are known to retard considerably the rate of dyeing on cellulose materials and it is probable that the leveling effect is due to the retardant action as well as from their other surface-active properties.

Several leveling agents recommended for the prevention or reduction of tippy dyeings have been examined*(22)*. Cross sections made from laboratory dyeings of Indocyanine B with and without leveling agents are illustrated.

Methods of Evaluation

As stated, there are no methods of evaluating leveling agents which have universal acceptance, or which may be considered as standards. However, a number of individual methods have been developed or evolved—some of which have appeared in the literature, many of which have not. Presented here are a number of these methods obtained either from literature search or from private correspondence. No attempt has been made to consider their relative merits—the effort has been to list every method available. In most cases the terminology is that of the author or correspondent. Generally speaking, there doe snot seem to be any method that yields a mathematical result; the procedures found in practice depend on the skill of the technician.

Due to the complexity of the dyeing process many mills rely primarily on plant tests for the evaluation of leveling agents. Many mill men feel that the only satisfactory method is to make a number of actual dye house runs with the particular material under study.

Robinson*(2)* suggests two procedures which he states have proved satisfactory in evaluative tests. The first of these is to employ a single package dyeing machine which indicates levelness as well as uniform penetration of the dye liquor. The second procedure is to take a small hank of slit cellophane and wrap a rubber band tightly around the fibers. By dyeing this specially prepared package, an indication of the ability of wetting agents to improve the level dyeing characteristics can be observed.

When package machine dyeings are used as the basis of evaluation, light dyeings of two (2) dyes known to possess rapid exhausting and poor leveling properties are made—a control dyeing with each and several additional dyeings using different quantities of the leveling agent. The dye-

* Burkart-Schier Chemical Company.

ings are processed according to standard procedure and skeins wound from each package to determine the uniformity of the dyeing and the proportionate value of the dyeing assistant.*(6)*

A third method for determining the ability of a product to act as a leveling agent in dyebaths has been suggested.*(3)* Dyebaths are made up containing:

1% Direct Blue RW
0.5, 1, 1.5 and 2% auxiliary or no auxiliary
40:1 volume

These figures are based on the weight of a ten gram skein. The bath is brought to the boil, 50% Glauber's salt is added and one 5-gram skein is entered into each bath. This is boiled for 15 minutes, then a second 5-gram cotton skein is added to each bath. Boiling is continued for 45 minutes. The skeins are removed, rinsed and dried.

The pairs of skeins which were in the same baths are closely examined. If both are the same depth of shade, the leveling action of the product is good. If the second entered skein is lighter than the first, the leveling is not complete. The more difference in depth of the two skeins, the poorer the leveling qualities of the material. If the material being tested is a good leveling agent, skeins entered in the dyebath at different times will match the other at the conclusion of the dyeing period.

The following simple method has often proved satisfactory in evaluating leveling agents*(4)*. Effectiveness of leveling action is checked on a money value basis and the procedure is as follows:

Dyeings of a color with a rapid exhaustion rate (Diamine Fast Red F or Purpurine 4B) are made on:

(1) 5-Gram pieces of a heavy cotton twill material (i.e. Army Herringbone), also on
(2) 5-gram skeins of single ply cotton yarn in the greige.

In each instance, three baths are prepared in 1:20 ratio with 1% dyestuff and 20% common salt, based on the weight of the goods.

Bath No. 1, a blank, contains no leveling assistant.
Bath No. 2, contains 1% of a Standard leveling assistant, and to
Bath No. 3 is added a money value equivalent of the sample to be tested.

Temperatures are raised to 200°F. and with no previous wetting the herringbone twill pieces are entered into Set Number 1 and the greige yarn into Set Number 2, and with a minimum of agitation, dyeings are carried out for 30 minutes. After a thorough cold water rinse and drying in warm air, the dyeings are examined—sample versus standard and both versus the blank for levelness and penetration.

Similar tests have been conducted with viscose piece goods and yarn, also by dyeing those fibers with vat colors, but experience has shown that a fast dyeing direct color on greige cotton yarn and heavy cotton twill will produce a more dependable evaluation*(4)*.

Leveling agents for wool have been studied extensively during the past several years in the application of metallized and meta-chrome dyes*(7)*. Leveling agents have two main functions in the application of metallized dyes: (a) the uniform distribution of dye and the elimination of tippiness, and (b) to produce solid shades with a minimum of sulfuric acid. If the addition of an agent causes precipitation and scumming in the dyebath, it would not be suitable for use with metallized dyes*(7)*.

The standard meta-chrome procedures generally produce extremely tippy results. An addition of certain leveling agents to a meta-chrome dye bath can prevent tippiness and produce level and brighter shades. Two methods are used for evaluating leveling agents with these dyes*(7)*.

A. Leveling agents in the presence of metallized dyes are evaluated by the so-called Calcomet procedure *(27, 28)*.
B. A standard meta-chrome method with and without the addition of leveling agent.
   (1) 1-6% Calcochrome dye
       1-2% Sodium bichromate
       4-8% Ammonium sulfate
       1-2% Ammonium hydroxide
   (2) 1-6% Calcochrome dye
       1-2% Sodium bichromate
       4-8% Ammonium sulfate
       1-2% Ammonium hydroxide
       1-4% Leveling agent

Bring to the boil in one hour and boil one hour. If bath requires further exhaustion add 1-3% acetic acid 28%.

A method for evaluating retarding agents in the presence of vat dyestuffs has been suggested*(5)*.

Preparation of dyebath:

0.8 g. Indanthrene Blue Green FFBW Pdr., a vat dye with so much affinity as to be suitable only for printing (or 2.4 g. of FFBN Double Paste Fine)
1.8 g. Caustic Soda, calculated on a dry basis
3.0 g. Hydrosulfite Conc. Fine Grains

Reduced in volume of 100 mls. for 10 minutes at 140°F., add 0.1 g. of retarding agent (10 mls. of a 1.0% solution) and dilute to final volume of exactly 400 mls. at 140°F.

Dye six 10-gram cotton skeins successively for three minutes each, squeezing out all possible liquor from each skein on removal and returning the squeezed-out liquor to the bath. Each skein should have been well prepared, wet out and squeezed before entry into the bath. Finish the six skeins in the manner usual for vat dyes.

Run a parallel bath containing no retarding agent. Run other retarding agents in like manner at the same time at varying concentrations. Concentrations of retarding agents are equivalent which give the same degree of retardation as seen by examination of the different sets of six successively dyed skeins.

It is generally accepted that the rate of dyeing and, therefore, the level dyeing properties of most of the direct, developed, and in some degree, that of the sulfur colors, can be at least partially controlled by temperature and salt. This is not true of the majority of the vat dyes, especially in light shades, when applied in circulating liquor machines, jigs and reels. To be most effective, retarding or leveling agents should exert their maximum efficiency at the start of the dyeing operation and should not exert an objectionable influence on the final shade, strength or fastness properties of the finished dyeing. On the basis of this reasoning preliminary tests were conducted as follows using dyes known to exhaust rapidly and possess poor leveling properties*(6)*.

A. Control dyeing—run 10 minutes.
B. Several dyeings using different quantities of the leveling agent being evaluated—run 10 minutes.
C. Control dyeing—run 45 minutes or standard dyeing time.
D. Duplicate dyeings of (B)—run full time as (C).

The dyeings are made in stainless steel or porcelain beakers using 10 or 20 grams of material for each test. The leveling agent is added to the prepared dyebath and all of the dyeings made according to standard method. A few of the most important fastness tests, such as light and washing, are made on the finished dyeings. On the basis of all these tests, the *initial retarding effect* of the leveling agent being evaluated can be observed as well as its *over all effect* on the finished dyeing. With vat dyes reduced paddings have been made using the leveling assistants in the pad liquor to find out if their use produces specked dyeings.

Experience has shown that when certain cationic agents are used as vat dye retarders, off shade and weak dyeings are often produced if the effect of the cationic substance is not neutralized by the addition of a suitable anionic agent to the dyebath. Therefore, when evaluating cationic agents another test is added to the four (4) previous mentioned*(6)*.

E. Dyeing plus cationic agent—run 10 minutes and then add suitable anionic

substance in several portions over a 10 to 20-minute period and continue dyeing for standard dyeing time.

ACTUAL EVALUATION.—To evaluate agents to assist in leveling non-uniform dyeings the following technique is employed*(6)*.

A standard dyeing is made and then divided into several equal portions. Leveling tests are then run using an equal quantity of undyed (white) as of dyed material and treating in a blank bath at either the prescribed dyeing temperature or one as high as the dye or material will withstand. Several tests are made using different quantities of the product being evaluated, together with the regular dyeing assistants. The efficiency of the leveling agent is based on its effect on the transfer properties of the dye from the dyed material to the undyed, as compared to the results obtained with the control test in which no leveling agent is used. The greater the transfer properties the more effective the dyeing assistant. This test can also be made in a package machine*(6)*.

The spectrophotometer and microscope can be of great assistance in evaluating this type of testing. For example, spectro readings of exhaust liquors will give an accurate picture of the retarding action of different leveling agents. The use of such assistants in the dyebath should produce better penetrated fibers, the degree of which can be more easily discerned under the microscope than with the naked eye*(6)*.

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(20) Smith, J. E. Ind. Eng. Chem. 31; 40 (1939).

(21) "The Effect of Surface Active Agents in Dyeing," J. Edward Smith, March 20, 1939, Am. Dyestuff Reptr.

(22) "The Tippy Dyeing of Wool and Its Control," New York Section, Intersectional Contest, Sept. 8, 1947, Am. Dyestuff Reptr.

(23) "General Properties of Acid Dyes." Application of Dyestuffs. J. Merritt Matthews, page 179.

(24) "Microscopic Observations of Wool Dyeing," H. E. Millson, G. L. Royer and M. E. Wissemann, Am. Dyestuff Reptr., Oct. 30, 1939.

(25) "Some Fundamental Principles of Vat Dyeing," O. W. Clark, Am. Dyestuff Reptr., Dec. 31, 1945.

(26) "Yarn and Cloth Dyeing," Frederick Reis, Oct. 5, 1936, Am. Dyestuff Reptr. Part II, Practical Control of Dyeing Processes to Assure Correct Shade and Level Dyeings.

(27) "Studies of Wool Dyeing: Comparison of Methods for Applying Chrome Colors," G. L. Royer, H. E. Millson and C. A. Amick, Calco Chemical Division, American Cyanamid Co.

(28) "Calcomet Process for the Dyeing of Wool," Calco Technical Bulletin No. 781.

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Successful Sales—

(Continued from Page P235)

assure the retailer of a high quality workmanship that will bring his product a greater consumer acceptance so that we not only have plastic materials especially tailored to the formulation demands of each particular product, but the maintenance of careful fabrication that is extremely necessary to high quality workmanship.

These components then, *formulation control* and *fabrication checking*, serve as a core for the development of a successful advertising and sales promotion program. For by referring to these points we can show the consumer that a proper plastic material which is designed for a specific end use is an example of exact formulation, careful scientific testing, and in the finished product, quality workmanship. The only successful method of transferring this information from us to the consumer is by a coordinated advertising and sales promotion program bearing a reputable trademark. With such a program you can instill in the mind of the consumer a confidence in your product as superior merchandise with an accompanying confidence in you as a reputable manufacturer. An excellent example of such an effective program is that conducted by Bakelite Corporation. Starting with the testing laboratories, this program extends to the nation's leading magazines. Space advertising and publicity are not only informative as to the latest in plastic developments, but they are the means of keeping the name in the public eye.

To prevent inaccuracies in these media, every advertisement, publicity release, booklet, or direct mailing piece is carefully checked by technical members of the organization.

Point-of-sale advertising is an extremely important part of this program. In every retail plastic article made from film and sheeting materials reaching the consumer market, there is an informative tag or label which identifies the product with the trade-mark and assures the buyer of high quality, in appearance as well as durability.

Vital to the full development of this program are informative speakers who appear in department store gatherings and before social and trade organization groups. These speakers, who are an effective means of creating good will, are of value not only at the time the speech is given, but also in the future. For when the listeners have occasion to recall some point, illustration, product, or process discussed by the speaker, they will almost immediately relate him with his corporation.

Now we have our blend of cooperation, product research and control, and factual information. This blend is a potential as well as actual force in making sales. This blend has resulted in developing new fields for plastic film and sheeting materials and thus causing vast inroads in fashion and home accessory markets.

Today the production rate of the whole industry in plastic film alone is 15,250,000 square yards per month . . . seven years ago, in 1941, this production rate was only 40,000 square yards per month. The important role that color has played in this production can be seen from the fact that seven years ago 80 per cent of film produced was clear, whereas today at least 40 per cent is in color. Two years ago 90 per cent of rainwear was clear; today

this situation is almost completely the reverse so that 95 per cent is in color.

New developments will not only extend the supplanting of textiles by plastics but will also augment textiles. For example, plastic material can be covered with flock to produce a type of velvet. Thus plastics will not only grow in use by themselves, but in combination with textiles, creating a wholly new market. In addition, the development of resinous or nonmigrating plasticizers for plastic film formulation will take up almost an entire field. They will become important in the manufacture of table covers and other related applications.

Because plastic materials have outstanding properties and possibilities, the limits of their uses have not been reached now, nor will they be reached five or ten years from now. As their possibilities become actualities, as their field of application increases, the relationship between the plastic industry and the color industry will increase proportionately. Thus, as the designer brings a new product into being and the manufacturer produces it, they will find in modern plastics the means of lengthening its service life, marking it as a quality product and enhancing its beauty. Then the product will be characterized by beauty as well as durability—a quality blend that will create new industries and make successful sales.

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Membership Applications

(Concluded from Page P231)

Lomer H. Lapointe, Bradford Durfee Technical Inst. Sponsor: J. Watters.

John T. McDonald, Bradford Durfee Technical Inst. Sponsor: J. Watters.

Arthur Mercer, Jr., Bradford Durfee Technical Inst. Sponsor: J. Watters.

Alfred J. Slowe, Bradford Durfee Technical Inst. Sponsor: J. Watters.

Paul H. Terry, Bradford Durfee Technical Inst. Sponsor: J. Watters.

Sanford J. H. Weldon, Bradford Durfee Technical Inst. Sponsor: J. Watters.

Sidney Wolin, Bradford Durfee Technical Inst. Sponsor: J. Watters.

Henry G. Ziemba, Bradford Durfee Technical Inst. Sponsor: J. Watters.

Roy H. Boggs, Clemson College. Sponsor: J. Lindsay, Jr.

Horatio S. Buck, Clemson College. Sponsor: J. Lindsay, Jr.

Jack H. Emerson, Clemson College. Sponsor: J. Lindsay, Jr.

Harold B. Hatfield, Jr., Clemson College. Sponsor: J. Lindsay, Jr.

Bennett M. Keasler, Clemson College. Sponsor: J. Lindsay, Jr.

William H. Keasler, Clemson College. Sponsor: J. Lindsay, Jr.

William L. Mathias, Clemson College. Sponsor: J. Lindsay, Jr.

Howell N. McGuire, Clemson College. Sponsor: J. Lindsay, Jr.

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Henry M. Reynolds, Jr., Clemson College. Sponsor: J. Lindsay, Jr.

Walter T. Rutledge, Jr., Clemson College. Sponsor: J. Lindsay, Jr.

William F. Taylor, Clemson College. Sponsor: J. Lindsay, Jr.

Guy N. Thompson, Jr., Clemson College. Sponsor: J. Lindsay, Jr.

Erwin C. Thornton, Clemson College. Sponsor: J. Lindsay, Jr.

Arthur F. Cacella, Inst. of Textile Technology. Sponsor: G. H. Coleman.

Laurence T. Cleary, Inst. of Textile Technology. Sponsor: G. H. Coleman.

William F. Gerrow, Jr., Inst. of Textile Technology. Sponsor: G. H. Coleman.

Walter T. Meinert, Inst. of Textile Technology. Sponsor: G. H. Coleman.

Walter M. Staub, Inst. of Textile Technology. Sponsor: G. H. Coleman.

Mortimer H. Bernstein, R. I. School of Design. Sponsor: H. B. Sturtevant.

Alexander Rothenberg, R. I. School of Design. Sponsor: H. B. Sturtevant.

Harold D. Fine, Harvard Business School (Formerly R. I. School). Sponsor: H. B. Sturtevant.

Jean E. Marcotte, St. Hyacinthe Textile School. Sponsor: G. R. Boule.

Zafer A. Sawwaf, Purdue University. Sponsor: R. N. Shreve.

Yeshwant J. Sane, Polytechnic Inst. of Brooklyn. Sponsor: D. F. Othmer.

APPLICATIONS FOR TRANSFER TO SENIOR MEMBERSHIP

Whitney R. Adams
Otto J. Agricola
George Alperin
William V. Bagley
John C. Busby, Jr.
Malcolm P. Coulman
Arthur E. Culp, Jr.
Benjamin S. Daniel
Malcolm P. Decker, Jr.
Peter DeMallie
Durwood B. Finn
Roger L. Gill
William A. Hoffman
Philip J. Howard
Gertrude A. Lathrop
Virgil D. Lyon
Joseph B. Masaschi
John W. Merrill
Albert S. Messer
George H. Momeier, Jr.
Thomas P. Moore, Jr.
Arthur J. Moreau
John M. Nesius
George F. Richardson
Charles R. Sandner
Basil G. Skalkeas
Robert E. Stevenson
Francis B. Wobecky

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Membership Applications

SENIOR

William E. Anders—Boss Dyer, Pioneer Textile Dyers, South Gate, Calif. Sponsors: H. A. DesMarais, J. Vadas.

Elmer C. Anderson—Supt. of Dyeing, Cheney Brothers, Manchester, Conn. Sponsors: J. J. Cervini, C. J. Felber.

Julius C. Boyles—Dye House Foreman, Adams Millis Corp., High Point, N. C. Sponsors: R. H. Smith, C. H. Miller.

Harold L. Brundage—Supt. of Dye. and Finish., Saskatchewan Wool Products, Moose Jaw, Canada. Sponsors: G. A. Wilkie, D. P. Knowland.

Graden D. Causey—Gen. Mgr., C. H. Masland & Sons, Philadelphia, Pa. Sponsors: A. E. Raimo, A. Schneider.

Alexander Challes—Dyer, Caljohn Corp., Brooklyn, N. Y. Sponsors: W. H. Espelin, W. W. Barre.

Anthony M. Choman—Night Foreman, Cheney Bros., Manchester, Conn. Sponsors: J. J. Cervini, C. J. Felber.

Wilhelm Christ—Chemist, Dyer & Colorist, Farbenfabriken Bayer, Leverkusen, Germany. Sponsors: C. Z. Draves, H. Luttringhaus.

George H. Clough—Asst. Foreman of Dyeing, American Thread Co., Fall River, Mass. Sponsors: W. H. Wingate, E. L. Manchester.

Ashu, T. Das—Dyeing & Printing Expert, Govt. Silk Technological Inst., Berhampore, West Bengal, India. Sponsors: C. A. Seibert, C. A. Sylvester.

Frederick K. Davis—Dyer & Finisher, Clark Brothers, Gloves, Inc., Glens Falls, N. Y. Sponsors: J. M. Washburn, Jr., J. T. Doole.

Lucius Delk—Asst. Supt., Union Bleachery, Greenville, S. C. Sponsors: E. T. Mobley, E. A. Briggs.

George A. Dickson—Foreman, Wool Dyeing, Cook Yarn Dye Mills, Inc., Phillipsdale, R. I. Sponsors: W. I. Cook, L. Palizza.

James E. Feeney—Prod. Mgr., R. W. Bates Piece Dye Works, Garnerville, N. Y. Sponsors: J. Niewaroski, J. Nehrings.

Brackett B. Fernald, Jr.—Salesman, Morton Chemical Co., Greensboro, N. C. Sponsors: J. L. Wyman, T. T. Wilheit.

Leo J. Frank—Boss Dyer, Anglo Fabrics Co., Inc., Webster, Mass. Sponsors: R. B. Taylorson, B. B. Meady.

Bernard Gutmann—Mgr., Richmond Textiles, Crompton-Richmond, New York, N. Y. Sponsors: L. S. Little, J. R. Nehmens.

Lamont Hagan—Chemist, Deering-Milliken Research Trust, Stamford, Conn. Sponsors: E. A. Murray, E. A. Wolff.

Oscar H. Hansen—Asst. Chemist, Hockmeyer Bros., Inc., Lowell, Mass. Sponsors: H. M. Pontefract, E. E. Fickett.

Charles K. Henry—Sr. Engr., Bigelow-Sanford Carpet Co., Inc., Thompsonville, Conn. Sponsors: E. A. Murray, O. M. Stamm.

Harold A. Jasmine—Asst. to Chief Chemist, Botany Mills, Inc., Passaic, N. J. Sponsors: H. Ehrhardt, F. R. Haigh.

Howard F. Johnson—Vice Pres. in Chg. of Sales, Lotte Chemical Co., Inc., Paterson, N. J. Sponsors: K. L. Dorman, H. L. Young.

Dale W. Kimsey—Dyestuff Technician, Geigy Co., Inc., Portland, Ore. Sponsors: E. B. O. Lindquist, A. McKenzie, Jr.

William M. Klein—Dir. of Research & Devel., Ritter Chemical Co., Amsterdam, N. Y. Sponsors: W. A. Nelson, D. O. Hamer, Jr.

John M. Loebel—Mgr. Sales Office, Sandoz Chemical Works, Ltd., Montreal, Que. Sponsors: C. H. A. Schmitt, J. C. Walker.

James Lord—Dyer, Horrocks & Bro., Philadelphia, Pa. Sponsors: J. Petty, T. H. Hart.

Albert R. Martin—Chemist, National Inst. of Cleaning & Dyeing, Silver Spring, Md. Sponsors: G. P. Fulton, W. A. Endriss.

Maurice A. Mazer—Chge. of Testing Lab., Charles Bloom, Inc., New York, N. Y. Sponsors: L. Fusser, H. H. Hatch.

Samuel R. Miller—Lab. Tech., Fred Whitaker Co., Philadelphia, Pa. Sponsors: J. Bauer, G. Altenbaumer.

Robert P. Monnier—Chemist, Cincinnati Chemical Works, Inc., Norwood, Ohio. Sponsors: T. Heginbotham, O. Hagist.

Lloyd G. Mount—Group Leader, Process Develop, Vat Dyes, Calco Chemical Div., American Cyanamid Co., Bound Brook, N. J. Sponsors: C. C. Kerns, E. Wirth.

Robert I. Moyer—Chemist & Dyer, Palatine Dyeing Co., St. Johnsville, N. Y. Sponsors: H. L. Dunlap, I. J. Smith.

John J. Murphy—Chief Control Chemist, Hartford Rayon Corp., Rocky Hill, Conn. Sponsors: C. I. Lakey, J. J. Marshall.

William D. Paine—Salesman, General Dyestuff Corp., Chicago, Ill. Sponsors: J. H. Hennessey, J. R. Bonnar.

Eugene J. Plaud—Finisher, Normandy Print Works, New Bedford, Mass. Sponsors: B. Frankfurt, E. F. Murphy.

Paul H. Rabe—Chemist, Farbenfabriken Bayer, Leverkusen a/Rh., Germany. Sponsors: C. Z. Draves, H. Luttringhaus.

Suleyman Somay—Research Chemist, Bradford Dyeing Assn., Bradford, R. I. Sponsors: A. Hustwit, E. J. Chornyei.

John P. Stanley—Chemist, Mohawk Carpet Mills, Inc., Amsterdam, N. Y. Sponsors: E. J. Cogovan, J. J. Hanlon.

Tu, Tzy-Jin—Vice Pres., Jong-Been Textile Co., Shanghai, China. Sponsors: W. J. Loeffler, J. L. Crist.

Albertus H. van der Heide—Sales & Service, N. V. Handelmaatschappy, R.S. Stokvis en Zonen, Rotterdam, Holland. Sponsors: C. A. Seibert, C. A. Sylvester.

Charles J. Weidmann—Chemist, Ciba Co., Ltd., Basle, Switzerland. Sponsors: J. P. Bauer, E. D. Lind.

Paul Wupperfeld—Supt. of Printing, Cheney Brothers, Manchester, Conn. Sponsors: J. J. Cervini, C. J. Felber.

JUNIOR

Margaret A. Adams—Text. Chemist, Lincoln Bleachery & Dye Works, Lonsdale, R. I. Sponsors: G. M. Gantz, J. J. Roarke.

John P. Barker—Chemist, General Aniline & Film Corp., Easton, Pa. Sponsors: C. Lawsberg, D. E. Marnon.

William F. Danner—Chief Chemist, Skenandoa Rayon Corp., Utica, N. Y. Sponsors: W. A. Nelson, D. O. Hamer, Jr.

Harry W. Fritz—Develop. Chemist, Celanese Corp. of America, Cumberland, Md. Sponsors: W. J. Cramer, Jr., Fletcher Horn.

John G. Honig—Chemist, National Inst. of Cleaning & Dyeing, Silver Spring, Md. Sponsors: G. P. Fulton, W. A. Endriss.

Robert A. Jedeikin—Chemist, Alexander Smith & Sons Carpet Co., Yonkers, N. Y. Sponsors: A. G. Ashcroft, E. A. Leonard.

James T. Lindley—Salesman, W. F. Fancourt Co., Philadelphia, Pa. Sponsors: W. F. Fancourt, 3rd, A. K. Haynes.

John R. Motha—Wool Tech. Service Repres., Cluett, Peabody & Co., Inc., North Troy, N. Y. Sponsors: J. Epelberg, L. S. Lang.

Vivian E. Neimeyer—Text. Chemist & Colorist, Botany Mills, Inc., Passaic, N. J. Sponsors: P. Otto, H. Ehrhardt.

Armand A. Poitras—Chemist, Consolidated Textile Co., North Adams, Mass. Sponsors: R. H. Williams, F. C. Hewitt.

Robert H. Quiri—Salesman, Ritter Chemical Co., Inc., Amsterdam, N. Y. Sponsors: W. A. Nelson, D. O. Hamer, Jr.

Isaac Wexler—Dye Chemist, Orleans Co., Long Island City, N. Y. Sponsors: F. A. Orleans, A. Rotcop.

EMPLOYMENT REGISTER

This column is open for four insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers, who can obtain further information from the Secretary.

48-24

Education: Expects B.S. in textile chemistry, Clemson College, 1949.

Experience: Two years stockman and metal worker; five years U. S. Navy. Officer in various student organizations.

Age 30; married; industrial and college references; N. E. preferred, but will go elsewhere; interested in textile resin application research. 1-10, 2-7, 3-7, 4-8

48-26

Education: Textile School.

Experience: 31 years overseer and superintendent of cotton bleaching, dyeing and finishing; retired at age limit.

Age 66; in excellent health; married; interested in work anywhere along Atlantic coast. 1-24, 2-7, 2-21, 3-7

49-1

Education: B.T.C., Lowell Textile Institute.

Experience: Laboratory technician, cost research, quality control, following army service.

Age 26; married; references. 1-24, 2-7, 2-21, 3-7

49-2

Education: High school, with college evening courses in chemical engineering.

Experience: Chemist, U.S. Navy and dye house.

Age 27; married; vicinity of New York City preferred. 1-24, 2-7, 2-21, 3-7

49-3

Education: Textile High School.

Experience: U. S. Army, clerk, one year textile colorist.

Age 24; married; reference. 2-7, 2-21, 3-7, 3-21

49-4

Education: Ph.D., organic chemistry; member Phi Beta Kappa, Sigma Xi.

Experience: Supervision of synthesis, and measurement of properties, of detergents and textile auxiliaries.

Age 39; married, happily employed but nearing end of research project; position in northern U. S. desired. 3-7, 3-21, 4-4, 4-18

49-5

Education: Lowell Textile Institute.

Experience: Textile Chemist and Quality Control Supervisor; Pilot, U. S. Navy Airbranch.

Age 32; married; references; position as Chief Chemist or Quality Control Director desired. 3-7, 3-21, 4-4, 4-18

TEXTILE COLORIST AND CONVERTER

Section

DERFLA HOWES SCHNERR
Editor

Contents for March 7, 1949

Special Articles

"Lantuck"—new bonded fabric. 242

Serious Wool Shortage, Council Holds 243

Modern Rayon Research Development 244

Disposable Covers for Rayon Cakes 245

Departments

Converting Markets 241

New Service, Products, Businesses 246

Personnel 248

Converting Markets

A fortnightly letter of news and views

February 28, 1949

DEAR DERFLA:

One of our contemporaries observes that the drastic new price decline experienced by most rayon fabrics during the past month was nothing more nor less than a "blow-off."

I think this is an accurate description of what happened. Mills and distributors who had been resisting the liquidation that got underway in the preceding 90 days finally decided that further resistance was futile. The resulting slashing of prices came as a shock to many buyers, but I think the market is nevertheless in a sounder position for having shaken out most of what remained of its inflationary water.

How much of the market's sense of shock was traceable to the character of some of the February merchandising by mills was a debatable point. Many of our friends seemed to take a keen delight in discussing that question—and most of their discussion centered around the price reductions publicized by one of the large-scale integrations.

Actually, a number of the prices named by the center in question merely met competition that was already in the making. What seemed to disturb the trade most were the circumstances surrounding the integration's action, especially an attendant statement of policy publishing published through the advertising columns.

"On the question of price," said the statement in part, "we are prepared to meet or to beat legitimate competitive values." As it stands, such a statement hardly sounds surprising. We had always assumed that the mass-producers must of necessity be strongly competitive in order to carry their great production loads.

Against the context of the market that existed at the time it was issued, however, this statement acquired extra-special meaning in the minds of many converters.

First, it seemed to confirm their earlier fears that some of the largest sellers had been slower than justified in adjusting to the short-comings of recent demand. Second, it suggested that the great size of the largest integrations had actually retarded their ability to remain flexible and fluid in a fast-declining market (a problem that many distributors had long ago foreseen).

One angle became fairly apparent as the month's price declines intensified, namely, that price appeal had temporarily lost a great deal of power to stimulate sales. Consequently, toward the close of February there was a noticeable lessening of pressure among a number of converters and others who had been previously welding the price-cutting knife with an abandon that stood confidence on its ear.

One purpose of the integration's aforementioned statement may have been to revive a sense of restraint among such sellers. Much nearer the truth, we think, is the explanation that during February the rayon cloth market entered the climactic phase of the liquidating cycle that began last Fall. From here on out the market may begin to show some signs of a steadier adjustment.

Activity in the cotton cloth goods market was extremely uneven during the month. There was a steady and rather satisfactory flow of reorders for seasonal merchandise both from wholesales and retailers. Less than a dozen items were involved in this demand, mainly solid color percales, piques, waffles, solid color broadcloths and lawns.

Staple business continued on a hand-to-mouth basis, and there was no hint that buyers were ready to move into Fall operations on any substantial

(*Continued on Page* 247)

"LANTUCK"—new bonded fabric

WELLINGTON SEARS COMPANY, of New York, selling agents for the West Point Manufacturing Company, West Point, Georgia, has announced the addition of a new department to handle the sales and engineering of "Lantuck," a new type of bonded fabric. Lantuck is being produced by the West Point Manufacturing Company at a new mill unit in Fairfax, Alabama.

The product represents something quite new in the development of industrial materials, and promises to be a major contribution to the industrial fabric field. The characteristics of Lantuck cause it to differ considerably from other bonded fabrics that have been introduced in the past, the manufacturers claim.

As readers of this publication are aware, bonded fabrics, sometimes called non-woven fabrics because no spinning or weaving processes are required, are generally made by treating a web of fibers with a bonding substance to form a fibrous mat or sheet. As far as can be learned, however, no other bonded fabric has yet combined the unique qualities found in Lantuck. Many previous bonded fabrics have been handicapped by the parallel arrangement of the fibers, with a resultant weakness in the filling, or crosswise, direction. Lantuck, on the other hand, has an almost completely random distribution of fibers. In other words, the direction in which the fibers point is irregular throughout the fabric. The random contsruction, therefore, is said to give the material equal strength in every direction—lengthwise, crosswise and diagonally.

LANTUCK should be of special importance to industrial users, as its balanced strength contributes to the element of uniformity which is so desirable in industrial fabrics. An example of this requirement may be found in the plastic laminating industry; and it was this very case, in fact, which led to the development of Lantuck.

The high pressure plastic laminating industry uses woven fabric and other materials as "fillers" to reinforce the laminates. In this process the filler material is first impregnated with some form of thermosetting resin. Sheets of the treated filler material are then stacked in layers and subjected to heavy pressure at high temperature to make one solid piece. The finished laminate is then used to make gears and other parts for mechanical and electrical equipment.

A survey in 1947, undertaken jointly by Wellington Sears Company and the Research Division of the West Point Manufacturing Company, revealed that the laminating industry was highly interested in the development of a bonded fabric of balanced strength to be used as a filler. The West Point Research Division succeeded within a very few weeks in producing a fiber web of the desired type, and a few months thereafter found a way to bond the fibers with resinous material without destroying the random characteristics of the original web. With the aid of resin suppliers, suitable bonding agents were found for applications in the plastic laminating industry.

Laminates made with this new material are said not only to be highly successful but to show some unusual results. The random distribution of fibers in the bonded fabric filler permits reinforcement of the laminate in all directions. This makes it possible to fabricate parts with small projections which must bear stress and strain in operation, as in the case of small gears and electrical timing parts. The laminates also stamp exceedingly well with smooth surfaces and no yarn ends protruding.

ANOTHER interesting factor is that no single bonding agent has been selected as universal for Lantuck. This makes it possible to develop the bonding agent best suited for each case, and thus to engineer the product for its specific end use. This opens other fields for development.

One application that shows great promise is the use of Lantuck as an interlining material in cold weather clothing. The manufacturers say that the same degree of warmth may be obtained with Lantuck using much less weight than that required with other materials commonly used for interlinings. Still other applications being investigated currently include coating with plastic or other materials, adaptation for use as backing and insulating materials, certain types of filters and various special industrial applications.

Lantuck also appears to be as versatile in respect to fiber selection as it is in the case of different bonding agents. In addition to the cotton fibers used in the earliest fabrics, success has been attained with rayon, acetate, and other fibers, both natural and man-made. Extensive research and development are continuing which promise to uncover a wide field of use for this new material.

MR. DENZIL V. PROBASCO of the Wellington Sears Engineering staff, who is in charge of distribution of Lantuck, was intimately connected with the development of the new product. Prior to joining the staff in 1947, he had already been a member of the Research Division of the West Point Manufacturing Company for four years, and was head of the fabric development department which took part in the creation of Lantuck. He had previously been associated with the American Viscose Corporation at Marcus Haak, Pennsylvania, and prior to that he was an associate professor at the Philadelphia Textile Institute.

Serious Wool Shortage, Council Holds

THE "almost unbelievable transformation" within three years of a great world wool surplus to a present acute shortage was cited recently by F. Eugene Ackerman, Executive Director of the American Wool Council, as the grave problem confronting the industry. Mr. Ackerman made the statement in an address delivered at the annual convention of the National Wool Growers Association and the American Wool Council.

As a result of the disruption of wool markets by the world war, with consequent destruction of the balance between wool consumption and wool production, he said, it had been expected that it would take more than a decade to dispose of the huge accumulations in the United States and the British Dominions. The critical problem facing wool growers at the outset of the post-war period, he said, was therefore one of surplus and controlled distribution.

This problem gave way, however, to that presented today when the world is consuming all apparel wool at a rate 24 per cent greater than production, and consuming fine apparel wool, of which this country is the largest user, at a rate 50 per cent in excess of production.

Noting that prices for wool have risen today to yield the domestic grower a satisfactory profit, Mr. Ackerman warned against any conclusion that this presented an ideal situation which makes unnecessary any program to increase markets or to extend the usefulness of wool. No greater error could be made, he declared, for although wool presently is one of the few commodities still enjoying a sellers' market, "already there are dark shadows visible on the horizon of its future."

The existing shortages of those types of wool in greatest demand are due, he said, not only to a decline in production but also to "an abnormal demand arising from many circumstances temporary in character," and both the shortage of supply and the spread between prices for medium and fine grades of wool are making wool more susceptible to competition and replacement by synthetic substitute fibers than ever before, a situation of which producers of the latter are taking full advantage.

AS a result of the great increase in population and in the birth rate in the United States and the record rate of employment at the highest wages in the world, Mr. Ackerman said, within the past four years consumption of apparel wool has been in excess of one billion grease pounds as compared to a maximum pre-war demand of 600 million pounds. And the chief demand has been for wools of fine character to make clothing of a quality higher than the American public has ever required. This accounts, he explained, for the annual production by American wool textile mills at the rate of more than 500 million linear yards of worsteds and woolens, valued at approximately $1,450,000,000 which is made into clothing with an estimated value of seven and a half billion dollars. And this tempting basic market the synthetic producers, with vastly expanding facilities and output, are determined to capture, according to Mr. Ackerman.

Referring to the merger of operations of the American Wool Council and the International Wool Secretariat, which was announced at the convention, Mr. Ackerman stated that their joint efforts, exerted through the Wool Bureau, of whose Executive Committee he is chairman, will greatly forward wool promotion. While the corporate entities of the two organizations will remain unchanged, duplication of their activities will be obviated by the Bureau which will conduct all research, promotion and education.

Of the importance of a program of wool promotion, he said: "Wool is the fiber most essential to the health and comfort of mankind. Every dollar of costs which accrue to wool as it moves from the sheep's back into consumer products increases its costs to the public. The ultimate cost of any wool product determines basically the size of its markets. Therefore, a fundamental factor in any successful program is to investigate scientifically the validity of these costs and, whenever possible, to lower them.

"We cannot expect to do this alone, but we believe that we can stimulate interest and action among all elements of the converting industries in research and engineering projects which will aid them in more expert and economical operation.

"The purchase of wool clothing is the largest expenditure every man, woman and child in this country makes for apparel items. A man's suit, overcoat or top coat, and the children's outer clothes all represent major expenditures of the clothing dollar. The man who buys a $50 suit is spending as much money in this one investment as he will spend for five years or more for shirts; ten years for socks; five years or more for neckties, and three years for underwear.

"Further, the quality of the outer clothing bought by both men and women determines the quality of accesories he will purchase. Cheap clothes mean cheap apparel accessories. Therefore, by maintaining high quality standards in the clothing sold their customers, retail stores are increasing the dollar value of every unit apparel sale in their stores. We intend to emphasize this fact, and also the economy in upkeep of well made wool clothing."

Modern Rayon Research and Development

THE development of rayon to its present state could have been done only by large concerns with very large resources, according to Charles H. Rutledge, public relations representative of the Du Pont Company.

Mr. Rutledge spoke on the industrial expansion of synthetic fiber production in the South before the Weekly Newspaper Section of the annual meeting of the South Carolina Press Association. The South is the leading producing area, with 50,000 workers employed in plants manufacturing such fibers.

Of necessity, most of the rayon producing companies "are in the category of what critics of free enterprise like to call big business," he said.

The modern research effort, such as went into rayon, requires large amounts of capital, he said, pointing out that Du Pont alone spent more than 30 million dollars on rayon research and that other firms spent comparable amounts.

"The risk, also, was of equal dimensions, for in the beginning, the outlook depended mainly on theoretical possibilities," Mr. Rutledge continued. "Only an organization which could afford to take that risk could put up the money to do the job."

In addition to research, there is a heavy investment in plants and equipment, "for the secret of low-cost operation lies in the development of intricate and costly equipment to permit continuous, economical operation," he said.

SUMS comparable to its expenditures in rayon research have been spent by the Du Pont Company on nylon and "Orlon" acrylic fiber, he added. "Orlon" is the new product which will be manufactured in the plant Du Pont is preparing to build near Camden, S. C.

Not only have the man-made fibers been responsible for much industrialization of the South, but the higher standards of living created by this and other developments of industry have resulted in greatly increased consumption of the natural fibers, he pointed out. Mr. Rutledge noted that while consumption of rayon rose from ten million pounds to one billion pounds between 1920 and 1947, the use of natural fibers, such as cotton, grew from three billion pounds to five billion, a net gain of two billion pounds.

Commenting that rayon and nylon have become a definite part of the textile industry because of their uniquely useful properties, Mr. Rutledge said "Orlon" has many such properties not found in other fibers, either natural or synthetic. It is more resistant to sunlight and atmosphere than any other fiber and has good resistance to degradation by heat and many chemicals.

"Our purpose is to manufacture a fiber which will render a service at the right price for countless individuals and textile mills large and small," he declared. "That is a fact because the Du Pont Company, as well as other big businesses, cannot exist without the thousands of smaller businesses to process its products into materials that will meet the needs and satisfy the public."

He further declared, "Thousands of the smaller units would not exist as they do today without being able to obtain the basic yarn which can be developed at low cost only on a big business basis.

"No element can stand alone. When a large business is injured by unwise legislation or ill-conceived interpretation of the law, the small businesses which it serves will ultimately be affected as well."

EMPHASIZING that a free press is essential, Mr. Rutledge commented to the editors: "If the editorial policies of America's newspapers were to be regulated and limited in scope, there would be opposition from every side. By the same token, the United States needs the freedom of initiative and enterprise which has made us great.

"All of the freedoms exist in delicate balance, one depending on the other. Throw one part out of balance and all of them may suffer."

Business, both big and little, "should be keenly aware of the need for a free press and the importance of keeping it free," Mr. Rutledge declared. "At the same time, that free press should be alert to, and cognizant of, the threats against our system of free enterprise. A threat against one is a threat against both. There is no compromise."

Disposable Cover now Printed for Positive Identification of Avisco Rayon Cakes

A NEW method of identifying rayon yarn sold in cake form has been worked out by American Viscose Corporation in conjunction with the Markem Machine Company of Keene, N. H. The new identification consists of an indelible description printed on the new disposable paper cover recently adopted by Avisco.

Identifying rayon yarn in cakes has always been a problem, the company explained, since the cakes must pass through a variety of chemical treatments and washing operations before they are packed and shipped. Then after receipt by the customer, cakes are often subject to further treatments, such as tinting or dyeing, before they are rewound into rigid packages. Under the old system, in which a lacing thread of distinctive color is used, each of these steps introduced opportunities for error, and the closest possible supervision was needed to assure accurate identification.

The new system promises to eliminate mistakes in identification, according to the company, because the printed cover is applied as soon as possible after the cake is withdrawn from the spinning box, and carries along a full description of the yarn through all the numerous steps of cake processing.

In addition to its primary function of identification, the printed cover also shows clearly when the cake is right side up, and, of course, the cakes wind more efficiently when placed in the proper position.

The new disposable paper covers are manufactured by a special machine, engineered and built for the purpose by Avisco engineers. The new printed identification has been made possible by the addition of a high-speed printing head on the machine, with facilities for quick shift of type to accommodate whatever description of yarn is being produced. The identification includes, in addition to the corporation's trademark "Avisco", the denier, filament count, luster, direction of twist, and "Lacing Notice" or lot number. The legend on a typical cake cover reads:

Avisco	75-30	LN
Viscose	Bright	224
Rayon	Z Twist	

A cake of rayon yarn in the disposable paper cover now printed for positive identification. The printed legend tells, in order, the producer, type of rayon, denier, filament count, luster, direction of twist, and "Lacing Notice" or lot number.

Because of the numerous chemicals, including acids, alkalies, bleaches, gelatins, oils, soaps, tints, and dyeing formulas, to which the covers may be subjected, it was necessary to employ a special ink for the printing. In addition, the ink must be dry within one second after printing, to prevent smudging as the paper passes through the cover-making machine.

The first printed disposable cake covers to be produced on a commercial scale are to be used this month with shipments from the Roanoke, Va., plant of American Viscose. The disposable paper cover, an exclusive Avisco feature, was adopted last summer for use of rayon yarn sold in cake form. It eliminates the five-cent deposit, with all the associated handling and bookkeeping required with the returnable knitted covers previously standard.

The special paper from which the disposable cover is made is actually far more permeable than the knitted cover. Weighing less, it absorbs far less sizing and dye, making for greater economy. Experience has also indicated in some cases that with the paper cover there is less waste and greater efficiency in winding and throwing.

Introduction of the disposable paper cover has given added impetus to the sale of rayon yarn in cakes, the form in which it comes from the spinning pots, the company maintains. More than a quarter of Avisco's yarn production is now sold in this package.

Cakes cost less than other packages, such as cones, skeins, and beams, because rewinding is eliminated at the rayon plant. This minimum handling also provides the mills with a cleaner yarn.

New Services, Products, Businesses

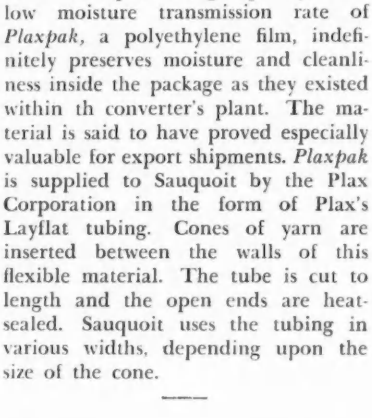
COTTON'S PROGRESS DURING THE PAST DECADE—will serve as the general theme of the National Cotton Council's eleventh annual meeting in Los Angeles, Calif., March 7-9, according to Harold A. Young, North Little Rock, Ark., Council president. He said that the annual session, which will bring together more than 1,200 cotton industry and agricultural leaders, will "give our industry an opportunity to look back over a decade of progress and to set the general pattern of activity for the decade ahead."

More soil resistant cotton textiles, fabrics which are more lustrous, and cotton fibers toughened to withstand greater abrasion may come from laboratories now concerned with these problems, according to Walter Randolph, chairman of the utilization research committee of the Council, who says that cotton research is being stepped up under the Research and Marketing Act. Work is going forward, he said, not only with fibers and textiles, but in such phases as consumer research, end uses of cotton, development of new products, and increased efficiencies in production, marketing and processing, both of cotton and cottonseed.

Adaption of cotton yarns to the new high-speed knitting machines, improvements in methods of cottonseed oil extraction, consumer preferences for textiles, and such problems as mechanized production and cotton insect control are among cotton research topics which will be discussed the first afternoon of the meeting.

Out of the test tubes are coming new processes for cotton—resin-coated fabrics which simulate leather but which are stronger, scuff-resistant, waterproof and durable. Crease resistant cottons, less prone to wrinkle, and mildew-proof cotton fabrics are already on the market. A flame proofing process is being used in the fabrics which go into night clothes, robes, draperies, rugs, and other materials, Mr. Randolph explained.

PRODUCT AIR CONDITIONING—is brought from converter to customer by the Sauquoit Silk Company, Scranton, Pennsylvania, by using *Plaxpak* for packaging of their cones of nylon and other yarn. According to the Plax Corporation, Sauquoit has found plant air conditioning conducive to good workmanship and high quality. The low moisture transmission rate of *Plaxpak*, a polyethylene film, indefinitely preserves moisture and cleanliness inside the package as they existed within th converter's plant. The material is said to have proved especially valuable for export shipments. *Plaxpak* is supplied to Sauquoit by the Plax Corporation in the form of Plax's Layflat tubing. Cones of yarn are inserted between the walls of this flexible material. The tube is cut to length and the open ends are heat-sealed. Sauquoit uses the tubing in various widths, depending upon the size of the cone.



Which is the better half? The left half of this beach coat has been treated with the brand new wrinkle resistant SUPERSET Resin introduced by Avondale Mills on cotton cord. This test garment was made up with half untreated cotton cord and the other half with treated cotton cord to test under actual wearing conditions the ability of the new finish to resist wrinkling. Not only did the treated half of the garment resist wrinkling much better, but when hung up overnight, practically all wrinkles came out of the treated fabric —not so of the untreated.

BURLINGTON MILLS has introduced "Copasetta", a crinkle-surfaced acetate and viscose fabric which will be merchandised by the Burlington Duplex Corporation.

It has a crisp hand, and its surface is puckered in even rows, giving much the same effect as the shirred taffeta shown by leading French designers. Because of its crinkled surface and finishing, "Copasetta" is wrinkle-resistant, and needs no pressing after cleaning, it is claimed.

ISSUANCE OF A SPECIAL COMMEMORATIVE STAMP IN HONOR OF 100 YEARS OF COTTON TEXTILE MANUFACTURING IN THE UNITED STATES—has been proposed to Post Office Department officials, and is also the subject of a bill introduced in the House of Representatives by Minority Leader Joseph W. Martin, Jr. (Mass.), the Association of Cotton Textile Merchants of New York has announced.

Establishment of cotton manufacturing marked the change in this country from a purely agricultural to an industrial economy, and is an historic occasion well worthy of commemoration, the Association indicated. President Washington records in his diary his visit to a cotton mill in Beverly, Mass., 160 years ago in 1789, and Samuel Slater, father of American industry, arrived in New York in that year and established the Slater Mill at Pawtucket, R. I., in 1790.

Suggested as a possible design for the stamp is the Old Slater Mill at Pawtucket, the present building dating from 1793, which is now a museum of the industry. Minority Leader Martin's bill specifically calls for a reproduction of the Old Slater Mill and calls for May 9 as the first day for issuance of the stamp. May 9 is the first day of National Cotton Week this year, an event which has been celebrated on a nation-wide scale for many years.

AT A MEETING OF COMMITTEE D12 OF SOAPS AND DETERGENTS—of the American Society for Testing Materials, to be held March 22 and 23 in the Sheraton Hotel, (formerly Park Central) in New York, special emphasis will be given to the use of radioisotopes for indicators in the degree of soil removal. This topic will be discussed by J. C. Harris of the Monsanto Chemical Company.

The new standard soiled fabrics prepared by the United States Testing

Company for the evaluation of detergency will be exhibited and will play an important part in the discussions on methods of testing. There will be talks on other detergency tests such as determination of wetting speed and pH value of detergent solutions.

THE BUREAU OF LABOR STATISTICS — is still initiating a series of conferences with trade associations and other appropriate groups and individuals in the textile industry preparatory to revision of the textile, clothing and apparel groups in its wholesale price index. The conferences, according to Ewan Clague, U. S. Commissioner of Labor Statistics, will constitute an important part of the preliminary planning for a general expansion and strengthening of its coverage of these items. Industry advice will also be sought at the same time in connection with obtaining additional information for the use of the Bureau of Agricultural Economics of the U. S. Department of Agriculture.

BOCON WDC — the new mothproofer which has received widespread press notices in the past year, is being launched to the dry cleaning industry by way of a mammoth merchandising and promotion program, according to Frank G. Burke, president of American Boconize Corp., manufacturers of the product.

Aside from being the only mothproofer to receive the U. S. Testing Company's Certified Merchandise Seal of Quality, it is also the only mothproofer offering a guarantee to completely mothproof woolens and knitted wear between dry cleanings.

THE SUMMER REFRESHER COURSE IN TEXTILES AND TESTING TECHNIQUES — will be offered for the 11th year, July 11-29, by the United States Testing Company and under the supervision of James Giblin. The course offers opportunity to study all phases of testing for textiles and related merchandise by lectures, demonstrations and laboratory practice work. Its staff technicians and facilities are made available for the course members. Mr. Giblin, head of the Textile Design Department at The New Bedford Textile Institute states, "The work of the nine main divisions of the company, namely, textile testing, microscopy, chemistry, microbiology, leather, dye chemistry, detergency, research, and engineering, will be represented in the three weeks' study. Field trips to a textile finishing mill and a manufacturer of synthetic fibers will be conducted for those interested.

TEST RUNS — started in February at the now completed Hilton-Davis, Cincinnati, plant for production of beta naphthol, important intermediate for organic colors and dyes. The new plant makes Hilton-Davis one of the three major manufacturers of beta naphthol in the United States.

Construction of the plant started 18 months ago. It was necessitated by expansion of the company's own color operations but output in excess of its own requirements will be sold to other users.

James F. Thompson, vice-president in charge of production, stated the plant should be in routine operation by April 1.

A NEW BOOKLET — entitled "Inventory of the Resources of the United States for Textile Research, Development, Education, and Testing", has just been issued by the Textile Section of the New York Board of Trade, Inc. Compiled by the Technical Committee of the organization, under the chairmanship of D. E. Douty, of United States Testing Company, Inc., it contains information on the above subjects which is not found in any other single document.

Dr. Douty, in announcing the issuance of the booklet, pointed out that as a reference booklet it will prove invaluable to all personnel in the textile and allied fields. "For the first time", he continued, "resources on research and development, testing and education are listed in one pamphlet." He explained that information was initially gathered together for the American representatives to Buxton, England, textile conference held last June.

GLYCO PRODUCTS CO., INC. — announces that all of its Brooklyn manufacturing and research facilities have been finally transferred to their main plant at Natrium, W. Va.

Consolidation of these manufacturing and research facilities has resulted in more efficient and economical production. This more central location puts it in an improved position for receiving raw materials and shipping finished products.

New stainless steel and glass-lined equipment recently installed for the manfacture of polyoxyethylene stearates and glyceryl monostearates is of the most recent design and of sufficiently large capacity to take care of greatly expanded demands.

MONSANTO CHEMICAL COMPANY — has enlarged its facilities for the production of tetrasodium pyrophosphate, in demand as an ingredient of "built" soaps and detergents.

At the same time, Robert S. Weatherly, Phosphate Division general manager of sales, announced that the recently completed additional furnace capacity for the production of elemental phosphorus is in full and successful operation. This product is widely used in "built" soaps and synthetic detergents, textile processing, cleaning compounds, and for conditioning oil well drilling muds.

THE NATIONAL RETAIL DRY GOODS ASSOCIATION — has announced it has formally asked the American Standards Association to set up performance standards for rayon fabrics. According to spokesmen for the NRDGA and the American Standards Assosciation, the proposed standards for rayon fabrics will be established through the organization of a national committee consisting of representatives from groups concerned with the production of distribution of rayon yard goods and finished garments as well as representatives of national consumer groups.

Converting Markets

(*Continued from Page* 241)

scale. On the contrary, the chain-store, mail-order groups continued to operate with extreme caution.

My net impression of the February market in cotton cloth was that a limited number of constructions had strengthened their position for spot and nearby-delivery, but that the situation as a whole lost a little ground. Mills in a number of instances accumulated inventories in excess of new orders. This would seem to suggest the approach of greater curtailment of production.

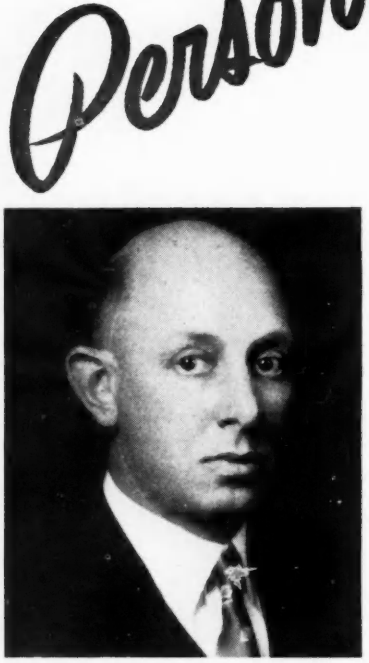
To end this letter on a more cheerful note, the most promising development in both the cotton and rayon cloth markets last month was a series of reports from retailers indicating that improved values were beginning more noticeably to help the movement of units.

In some instances, the unit sales gains during February were so satisfactory as to put dollar volume well in excess of 1948 figures for women's apparel departments.

Until next time,

BILL LAWRENCE.

Personnel



Directors of the United States Finishing Company, Norwich, Conn., have announced the appointment of TRACY A. ADAMS, textile chemical engineer, above, as Executive Vice President and General Manager. Mr. Adams will take over active supervision of an extensive modernization and rehabilitation program at the four plants of the company located in Norwich, Sterling, Conn., Providence (Queens), R. I., and Hartsville, S. C. Widely experienced in the new techniques of textile processing and finishing, the veteran New England authority will leave his post this week as Consulting Engineer with Barnes Textile Associates of Boston, to assume his new duties with headquarters at the Norwich plant. Formerly Executive Vice President and General Manager of the Arnold Print Works, North Adams, Mass., Mr. Adams has served as Manager of the Lawrence Print Works of the Aspinook Company and prior to that as Superintendent of the Plain Shade Plant of the Sayles Finishing Company, Saylesville, R. I. The company also announced that JARRED J. MOWRY, long associated in supervisory capacities, has resigned as Executive Vice President and General Manager, to assume the post of General Manager of the Hartsville, S. C., plant. The lightening of Mr. Mowry's duties was made necessary as the result of physician's orders. He will continue as a member of the Board of Directors.

The New England Textile Foundation, Providence, has announced that R. K. HUBBARD, President of Packard Mills, Inc., Webster, Mass.; G. A. McCLATCHIE, President of The United States Finishing Company, Norwich, Conn.; and A. I. WEBBER, Treasurer of Merrimack Manufacturing Co., Lowell, Mass., were recently elected to the Executive Committe of th Foundation. Mr. Webber succeeds Gordon Osborne, President of Warwick Mills, whose term recently expired. He represents the cotton industry in accordance with the Indenture of the Foundation and will serve a term of five years. Mr. Hubbard and Mr. McClatchie are new members at large, elected to bring the Executive Committee up to 7 members in accordance with a recent amendment to the Indenture. Mr. Hubbard will serve 5 years and Mr. McClatchie 4 years.

DR. THOMAS H. DAUGHERTY — has been named assistant director of research for Calgon, Inc., Pittsburgh. D. J. Erikson, president of Calgon and affiliated companies, simultaneously announced appointment of C. E. Kaufman as assistant director of chemical research, Hall Laboratories, Inc. Dr. Everett P. Partridge, Hall-Calgon research director, explained that Dr. Daugherty will be in immediate charge of research and development projects, serving as coordinator of development work in the application of "Calgon," the sodium phosphate glass, and other products of the company in various uses. Calgon is extensively used in textile, leather and paper processing, in domestic, industrial and municipal water treatment and as an ingredient of various compounds for specialized tasks.

ERNEST D. KOSTING — has been appointed Advertising Manager of Burlington Mills Corp. (N. Y.), and will report directly to Kenneth Collins, Vice President in charge of Advertising and Public Relations. Mr. Kosting has been associated with the advertising field for the past eighteen years. Prior to joining Burlington, he was with Geyer, Newell & Ganger, Inc., and formerly was Associate Copy Director of J. M. Mathes, Inc.

TOM EDISON BENNETT — has been appointed manager of the Los Angeles office of Waverly Fabrics Division, F. Schumacher & Co., Inc., decorative fabrics house.

Mr. Bennett, who has been associated with Waverly since 1939, succeeds Henry Rose, Jr., resigned.

GEORGE W. NICELY — above, has been appointed to head the spun rayon department of Southeastern Cottons, Inc. (58 Worth Street, New York City). Mr. Nicely has, for the last several years been in charge of sales for the Fontaine Converting Works, Inc. Prior to that assignment, he organized and operated the British American Silk Mills, Ltd., in Canada. He has also been sales representative of the Dominion Silk Dyeing and Finishing Co., and the National Dyeing and Printing Co . He is a member of the board of directors of the Silk and Rayon Dyers and Printers Association.

LEONARD A. MOBLEY — of Yazoo City, Miss., has been appointed to a post on the staff of the National Cotton Council's foreign trade division.

Mr. Mobley, who graduated from Mississippi State College last month, will work in the field of cotton production and distribution problems as related to international trade. He will be assigned to the Council's Washington office.

TRADE NOTES • NEW PRODUCTS

• du Pont Appointment

Dr. Miles A. Dahlen has been appointed director of sales of the Fine Chemicals Division of the du Pont Company's Organic Chemicals Department succeeding Kenneth T. King. Mr. King plans to retire June 30 after completing 30 years of service with the company. Until then he will assist Dr. Dahlen in his new duties. Mr. King has been in charge of the Fine Chemicals Division since 1933. Dr. Dahlen has been assistant manager of domestic sales of the Dyestuffs Division, Organic Chemicals Department, since 1946.

Miles A. Dahlen

Dr. Dahlen joined du Pont in 1928, after receiving his degree of doctor of philosophy in organic chemistry from the University of Minnesota where he was a du Pont fellow in 1927 and 1928. He received his degree of bachelor of science in chemical engineering from the University of Minnesota in 1924.

Dr. Dahlen has written many articles for technical publications, and a number of patents have been granted on his inventions in the chemical field. He was a consultant to the U. S. Army, and a member of a technical intelligence mission in Europe from July to November, 1945. He has been a director of the Textile Research Institute, Inc., since 1946; and a member of the Executive Committee on Research of the American Association of Textile Chemists and Colorists from 1948-1951; chairman of the Delaware Section of the American Chemical Society for 1938.

• Seydel-Woolley Finishing Division

Seydel-Woolley & Company, Atlanta, Georgia, one of the nation's oldest and largest manufacturers of warp sizing, announces the formation of a new Finishing Division which will manufacture chemicals and render service to the wet processing branch of the textile industry.

David Meriwether

Plant expansion for the manufacture of these products has been made, and among the products offered are the following: detergents, wetting agents, dyebath assistants, desize assistants, softeners, Sanforizing oils, kier oils, scouring agents, soluble oils, and coning oils.

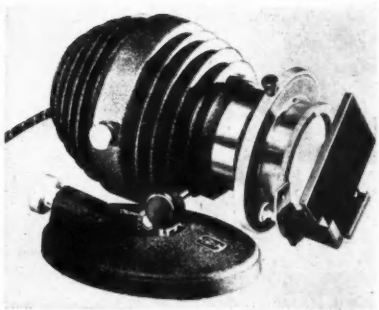
The appointment of David Meriwether of Greenville, South Carolina, as General Sales Representative for the new Division is also announced. Mr. Meriwether is a native of Knoxville, Tennessee, having received his education there and completed his studies with a degree from the University of Tennessee in 1931.

After leaving college, Mr. Meriwether was employed for 10 years by the Southern Bleachery and Print Works, Inc., Taylors, South Carolina. He was called to active service by the Army in 1941, serving until March 1946, and at the time of his discharge was serving as Regimental Commander and Lieutenant Colonel at Fort Jackson, South Carolina. After leaving the Army, Mr. Meriwether was associated with Tennessee Textile Company, Inc., Chattanooga, Tennessee as General Manager, and left them a year or so later to accept a position as Vice-President and General Manager of the Rockland Bleach and Dye Works, Brooklandville, Maryland. He comes from this position to Seydel-Woolley.

• Microscope Illuminator

A new Microscope Illuminator designed exclusively for routine and advanced laboratory work is announced by American Optical Company's Scientific Instrument Division, Buffalo, N. Y. The lamp furnishes both Kohler and parallel illumination for bright field and phase microscopy, photomicrography, microprojection, and dark field illumination.

All adjustments are external and located for user convenience. Ventilating fins on the die-cast aluminum body, coupled with natural draft ventilation, are said to assure cool operation. Rack and pinion focusing adjustment is equipped with two buttons for focusing by either left or right hand. A screw-type tilting adjustment, operating in threaded nut, is placed low and to the rear of the base for handling coolness. The silvered,



American Optical Microscope Illuminator

concave glass reflecting mirror is said to be quickly and precisely adjusted at any time by means of three screws. For easy access to lamp, chimney, bulb, reflecting mirror and lens surfaces, the lamp body may be separated by releasing two thumb screws. A standard G. E. 100 watt, 115 volt bayonet base bulb is used.

The new Spencer No. 735 Microscope Illuminator may be obtained with or without an iris diaphragm which has both knurled ring and knob adjustments. A single filter holder for either ground or blue glasses is available, also a multiple filter holder attachment which accommodates up to four rectangular filters simultaneously.

• Mathieson Personnel Changes

Mathieson Chemical Corporation announces three recent changes in personnel. Roland F. Boehm, who was District Sales Manager of the Houston, Texas office, has been transferred to the ammonia department, with headquarters in the company's New York offices. O. J. Theobald, Jr., formerly District Sales Manager of Mathieson's Charlotte, N. C. office, replaces Mr. Boehm as District Sales Manager of the Houston office. J. F. Carey,

formerly a sales representative in the Charlotte territory, has been named District Sales Manager of the Charlotte office.

Mr. Boehm joined Mathieson in 1946, when his work was connected with the distribution of the output of the Lake Charles ammonia plant. Previously he held positions with the War Production Board, as Assistant Chief of the Nitrogen Unit, and, after a period of service in the Armed Forces, with Nitrogen Products, Inc., in an executive capacity.

Mr. Theobald joined Mathieson in 1932 as a member of the sales staff and has held a number of positions with the company. He is a graduate of Purdue, and a member of several organizations, including the American Chemical Society and the American Association of Textile Chemists and Colorists.

Mr. Carey received his chemical degree from Tufts College and shortly after his graduation in 1937 joined Mathieson where he has been active in sales and sales development. He too is a member of the American Chemical Society and the American Association of Textile Chemists and Colorists.

• Heat Setting Machine

The Morrison Machine Co. of Paterson, New Jersey announces a new Heat Setting Machine for nylon, acetate, "Orlon" acrylic fiber, and similar products.

This machine is gas fired, totally enclosed, and has been designed with efficient devices for safety as well as accurate control of speed, temperature, and exposure time. It is stated that the machine is equipped to handle the finest sheer fabrics or the heaviest weight duck at practical production speeds.

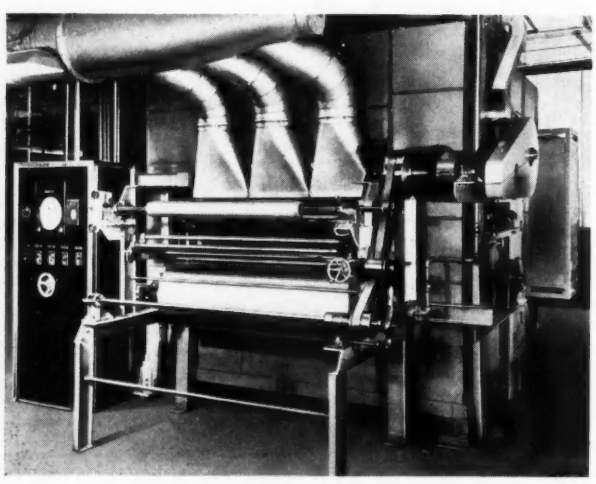
It is claimed that tests have clearly indicated that the heat setting of nylon fabrics in this machine improves both their resilience and crease resistance. Moreover, these properties are not destroyed by subsequent laundering and ironing.

It is stated that various other valuable characteristics have been obtained, such as: improved dimensional stability including virtual elimination of shrinkage; elimination or reduction of tight places from weaving; and a softer and more velvety feel than the fabric had in the unset form. These characteristics have all been produced without weakening the inherent strength of this unusual textile fiber, it is said.

The setting is done by high velocity dry heat, during which process, products of combustion of the fuel gases are properly exhausted along with other residue.

The original machine was designed and built by the Fair Lawn Finishing Company of Fair Lawn, N. J., with various integral parts being supplied by the Morrison Machine Co., and the dryer housing constructed by Andrews & Goodrich. Patents have been applied for.

The standard machine will be manufactured exclusively by the Morrison Machine Co., Paterson, N. J. Three units are now in production: one for export to Switzerland; one for the Waldrich Bleachery, Delawanna, N. J.; and another for Richmond Piece Dye Works, Richmond, Virginia.



Heat Setting Machine

• General Aniline Appointment

Dr. Henry B. Hass (above) of Purdue University has been appointed Manager of Research and Development of General Aniline & Film Corporation. A native of Ohio, Dr. Hass was graduated from Ohio Wesleyan University in 1921, received his Ph.D. from Ohio State University in 1925. He became a teacher at Purdue in 1928 and has been Head of the Chemistry Department since 1937. During World War II Dr. Hass was closely associated with the Manhattan Project for Atomic Energy.

For many years he has been a consultant to chemical corporations and he is the holder of scores of patents covering chemical products and processes.

• Bis(trifluoromethyl)-benzene

The pilot plant production of bis(trifluoromethyl)benzene (xylene hexafluoride) is under way at the Hooker Electrochemical Company, Niagara Falls, New York. The product is a mixture of the para and meta isomers. It has a specific gravity at 20°C of 1.395, a freezing range of —40° to —50°C, a distillation range of 113° to 117°C, and a flash point of 37°C.

Among the possible uses suggested by its chemical and physical properties are, intermediate in the preparation of non-inflammable dielectric and hydraulic fluids and starting material for the preparation of dyestuffs.

Technical Data Sheet No. 368, describing the product more fully, is available.

• Spring Meeting, Textile School Deans

The Spring meeting of the National Council of Textile School Deans will be held at Charlottesville, Va., March 21-23, according to Edward T. Pickard, secretary of the Textile Foundation, Washington, D. C.

The group will hold its sessions at the Institute of Textile Technology.

About 25 textile school deans and officials of the Textile Foundation are expected to attend the conference.

Schools which are represented in the Council include: Clemson College, Alabama Polytechnic Institute, North Carolina State College, Institute of Textile Technology, Bradford Durfee Technical Institute, Philadelphia Textile Institute, Georgia School of Technology, Lowell

Textile Institute, Textile School of the Rhode Island School of Design, George Washington University, Texas Technological College, Massachusetts Institute of Technology, and New Bradford Textile Institute.

The Council of Textile Deans is holding this meeting in Charlottesville upon the invitation of Ward Delaney, president of the Institute of Textile Technology, and Dr. George Coleman, dean.

• Hooker Executive Changes

E. R. Bartlett, president of the Hooker Electrochemical Company has announced the resignation of H. M. Hooker as chairman of the board of directors of the company. Mr. Hooker will continue as a member of the board of directors.

R. L. Murray

J. H. Babcock

Other organizational changes were made known at the same time. R. L. Murray who was vice-president in charge of development and research is now executive vice-president. R. W. Hooker who has been vice-president and sales manager is now vice-president in charge of sales. J. H. Babcock, formerly manager of developing and research, has been named director in full charge of activities of that department. R. E. Wilkin, who has been eastern sales manager, is now general sales manager with his sales responsibilities extended to include west coast as well as eastern sales.

• Wrinkle Resistance Survey

A sampling of department and men's stores in twenty states shows that buyers and merchandise managers want new sales appeals for rainwear, and that the overwhelming majority believe that wrinkle resistance combined with water repellent treatments will increase sales of rainwear, according to George C. Ramey of American Cyanamid Company's Textile Resin Department.

Eighty-seven per cent of the stores queried expressed a desire for the addition of wrinkle or crease resistance, and 65 per cent were positive the addition would increase sales.

Need for a more careful application of water repellents, and use only of those repellents that can pass high rating tests was expressed by several stores.

Percentage wise responses were as follows: favoring combination of wrinkle resistance with water repellency were 87 per cent; enthusiastically in favor, 67 per cent; stores who believe the combination finish would have advertising and promotional value for them, 97 per cent.

Every store strongly endorsed the labeling of garments as important to customers and of real value in making sales, and the majority felt that a combination label would be preferable to two labels.

Cyanamid's Textile Resin Department is currently supplying a number of mills with its Permel plus—a combination water repellent and wrinkle resistant finish.

• Joins Stafford Printers

Goodman & Theise, Inc., makers of Fabrics by Stafford, have announced that George Piacitelli is now connected with the Stafford Printers Division of Goodman & Theise, Inc. at Stafford Springs, Connecticut. Mr. Piacitelli is in charge of the Print Division. This appointment became effective February 14, 1949.

• Rezgard A Approved

Approval of Monsanto Chemical Company's "Rezgard A" as a flame retardant finish for cotton and viscose rayon by the New York City Board of Standards and Appeals has been announced by the company.

Fabrics treated with Rezgard A passed tests conducted by the Better Fabrics Testing Bureau, it was disclosed by E. W. Gamble, director of the textile chemical department of Monsanto's Merrimac Division. The tests were made under the board requirements for determination of fire resistance.

Rezgard A, an inexpensive white crystalline powder of the phosphate type, is applied to fabric in the mill. The cloth is immersed in a bath containing the flame retardant, squeezed through rolls and then dried.

Four types of fabrics were tested: all-cotton sheeting, all-viscose rayon dress fabric, all-cotton monks cloth and all-cotton plush.

The board recommended that each container in which Rezgard A is marketed by Monsanto shall be labeled or marked "Approved by the Board of Standards and Appeals for use in New York City under Calendar No. 1089-47-SM."

• To Speak at Textile Institute Conference

"Industrial Applications of Stress-Strain Relationships" will be the title of a paper to be presented by Dr. Walter J. Hamburger, Director, Fabric Research Laboratories, Inc., Boston, Massachusetts, before the Annual Conference of the Textile Institute (British) to be held in Dublin, Ireland, May 24 to 27, 1949.

In accepting the invitation to present this paper, Dr. Hamburger pointed out that the theme of the Conference in Dublin is to be "The Industrial Application of New Knowledge", and the data he will present will reflect the efforts of Fabric Research Laboratories over the years to pioneer in the application of fundamental problems in the textile and allied fields. It will be particularly gratifying, Dr. Hamburger continued, to demonstrate that an effective bridge has been built to effect a quicker liaison between fundamental science and its application in industry.

Prior to the Conference of the Textile Institute, Dr. Hamburger plans to spend a number of weeks in Great Britain, France, Holland, Belgium, and the Scandinavian countries, visiting textile research centers and exchanging technical data and experiences. Dr. Hamburger, in addition, has been invited to lecture at the Swedish Institute for Textile Research in Gothenburg, Sweden; The Fibre Research Institute in Delft, Holland; and Leeds University, Leeds, England.

• Gordon Research Conferences, AAAS

The Gordon Research Conferences, sponsored by the AAAS, formerly known as the Gibson Island Research Conferences, for 1949, will be held from June 20 to September 2 at the Colby Junior College, New London, New Hampshire. The conferences were established to stimulate research in universities, research foundations and industrial laboratories. This purpose is achieved by an informal type of meeting consisting of the scheduled lec-

tures and free discussion groups. Sufficient time is available to stimulate informal discussions among the members of a conference. Meetings are held in the morning and in the evening, Monday through Friday, with the exception of Friday evening.

The purpose of the program is not to review the known fields of chemistry, but primarily to bring experts up to date as to the latest developments, analyze the significance of these developments, and to provoke suggestions as to underlying theories and profitable methods of approach for making new progress.

Individuals interested in attending the Conferences are requested to send in their applications to the Director, on or before April 1. Each applicant must state the institution or company with which he is connected and the type of work in which he is most interested. Attendance at each Conference is limited to 100.

Requests for attendance at the Conferences, or for any additional information should be addressed to W. George Parks, Director, Department of Chemistry, Rhode Island State College, Kingston, Rhode Island. From June 15 to September 1, 1949, mail should be addressed to Colby Junior College, New London, New Hampshire.

The program for the Textile Conference is as follows:

J. H. DILLON, *Chairman*
EARL E. BERKLEY, *Vice-Chairman*

July 18

H. MARKS. Principles for the Selection of Fiber-Forming Materials.

R. C. HOUTZ. "Orlon" Acrylic Fiber: Chemistry and Properties.

July 19

MILTON HARRIS. The Nature of the Felting Phenomenon and of Some Anti-Felt Treatments.

E. L. SKAU. A Calorimetric Investigation of the Cellulose-Water Relationships in Textile Fibers.

July 20

WILLIAM UTERMOHLEN. Detergency Studies.

T. E. MORTON. Dyeing of Cellulose Considered as a Diffusion Process.

July 21

J. W. ROWEN. Some Infra Red Studies on Cellulosic Compounds.

JOSEPH BRANT. Discussion of Crease-Resistant Treatments of Fine Cotton Fabrics.

July 22

ROBERT HOFFMAN. Relationship of Fiber Properties to Fabric Properties.

OBITUARY

WILLIAM V. BAKER

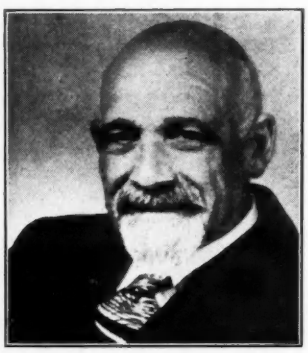
WILLIAM V. BAKER, sales manager of the Althouse Chemical Co., Inc. of Reading, Pennsylvania, died February 4th following a brief illness in University Hospital, Philadelphia. He was 53.

Mr. Baker graduated from the Wharton School, University of Pennsylvania, and served in World War I as a lieutenant in the Army. Prior to his connection with the dyestuff industry, he was an accountant with the firm of Ernst and Ernst of Philadelphia. He came with the Althouse Chemical Co. 18 years ago as a salesman and was closely associated with this firm's expansion as well as with the promotion of faster dyes for textiles that marked the dyestuff industry's progress during that time. For the past 10 years, he held the position of sales manager. He was a member of the A.A.T.C.C.

He is survived by his wife, a daughter and a son.

SAMUEL ISERMANN

DR. SAMUEL ISERMANN, president of Van Dyk & Company, Inc., died February 1, in San Antonio, Texas, en route to his winter home in Tucson, Arizona.



Samuel Isermann

Dr. Isermann was an outstanding figure in perfumery and cosmetic circles and was a pioneer in the manufacture in this country of organic chemicals, including raw materials for perfumes, dyes, etc. He was an ardent proponent of the self-sufficiency of the United States from a chemical standpoint. He was associated with the late Francis P. Garvan in the fight that enabled the infant American chemical industry to retain the foothold that it had gained during the first World War.

Among other companies which Dr. Isermann developed and in the management of which he was actively associated are: Patent Chemicals, Inc., Synthetic Chemicals, Inc., and Summit Chemical Products Corp.

He is survived by his wife and daughter, as well as several sisters.

* * *

The following tribute to Dr. Isermann, a former member of the Board of Governors and an honorary member of the Synthetic Organic Chemical Manufacturers Association, was adopted at its meeting of February 9, 1949:

Samuel Isermann, an honorary member of the Synthetic Organic Chemical Manufacturers Association, passed away on February 1, 1949.

He was a staunch advocate in the cause of an independent synthetic organic chemical industry in the United States.

In the days of the dye famine in World War I he organized a company which contributed to the alleviation of the shortage of dyes and fine synthetic chemicals.

In the long campaign waged before Congress for the purpose of obtaining adequate protection for the industry he gave generously both of time and effort.

In the passing of Samuel Isermann the coal-tar chemical industry has lost an enthusiastic associate and colleague.

Therefore, be it resolved that in appreciation of the outstanding contribution of Samuel Isermann to the furtherance of organic chemistry in America and in token of the deep sorrow felt by this Association, this resolution be spread on the minutes of this meeting and copies be sent to the family of the deceased and to his business associates.

HENRY F. ATHERTON

HENRY F. ATHERTON, formerly president of the Allied Chemical & Dye Corporation and, at his death, chairman of its board, died on February 10th while on vacation in Boca Grande, Florida. He was 65 years old.

Mr. Atherton was born in Nashua, New Hampshire and received an A.B. degree from Harvard in 1905 and an LL.B. from Harvard Law School three years later. He was admitted to the bar in New York in 1909 and carried on a law practice until 1919 when he became secretary of the National Aniline and Chemical Company. He held this position until the company was acquired by Allied and then served as secretary of the latter firm until 1933. He then served a year as vice president before becoming president. He served as president until 1946 and had been board chairman since 1935.

Mr. Atherton was a member of the chemical advisory committee of the Army-Navy Munitions Board since 1939 and received a certificate of appreciation from the Secretary of War in 1945. He served as a captain in the Army during the first World War. He was a member of the Chemistry Visiting Committee of the Board of Overseers of Harvard and of the Association of the Bar of the City of New York. He was also a member of the Harvard, Knickerbocker, Racquet and Tennis, and Recess Clubs in New York, the Down Town Association in New York, and the Piping Rock Club in Long Island.

Surviving are his wife, a son, and a sister.

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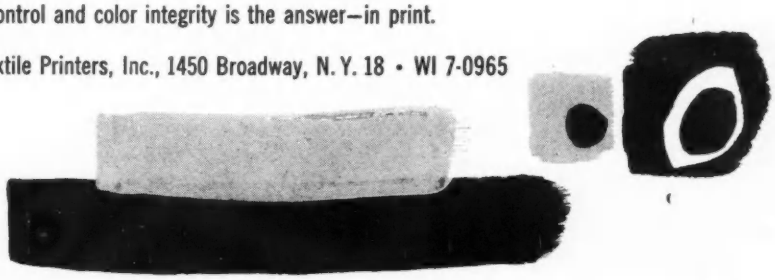

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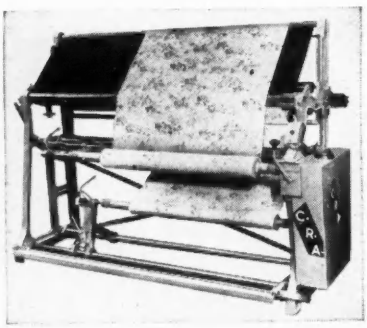

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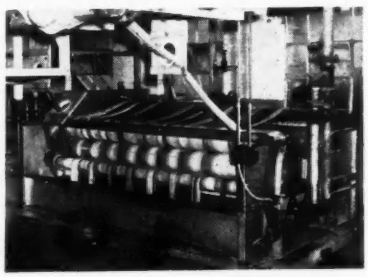

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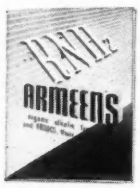

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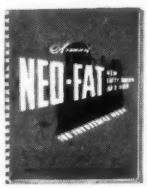

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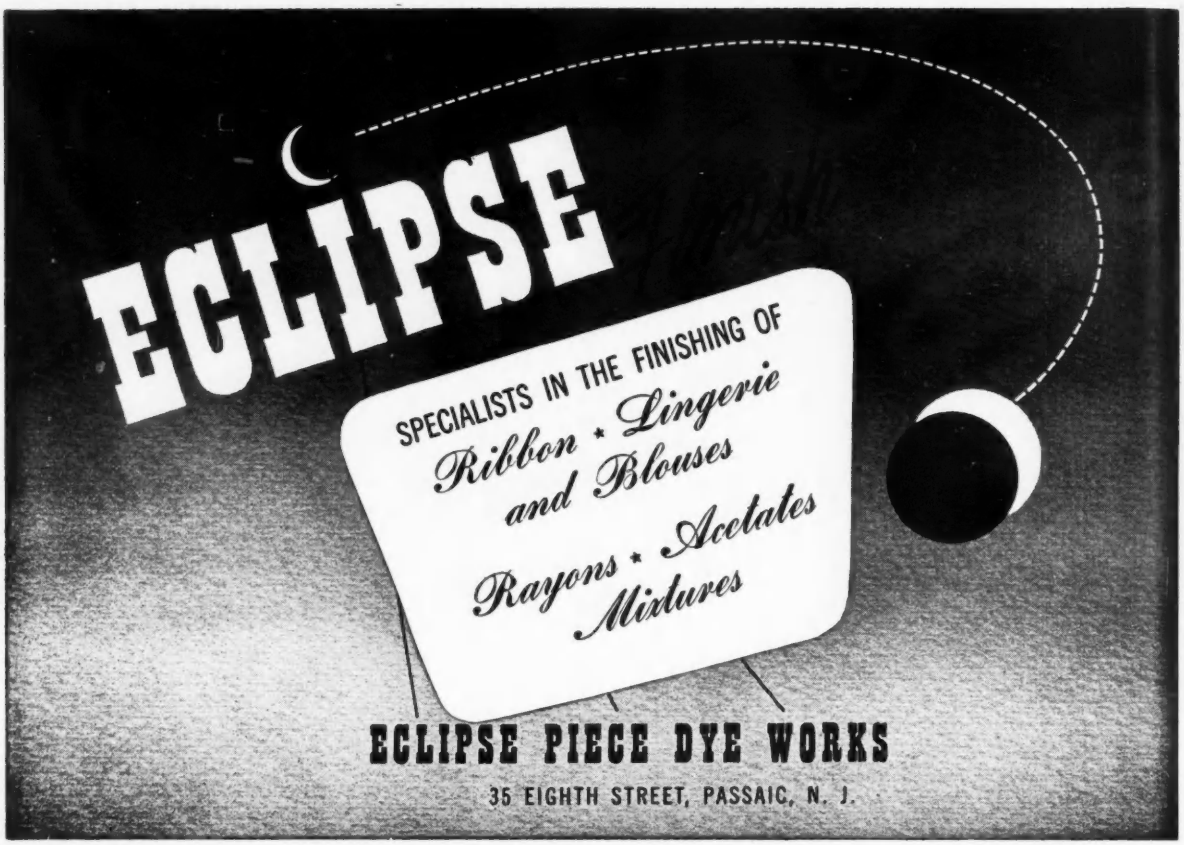

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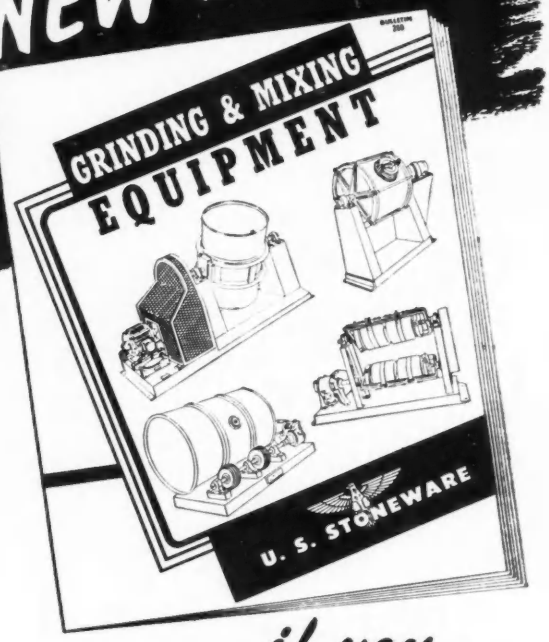

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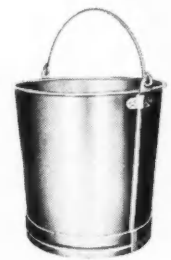

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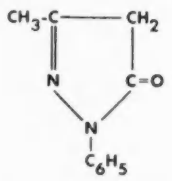

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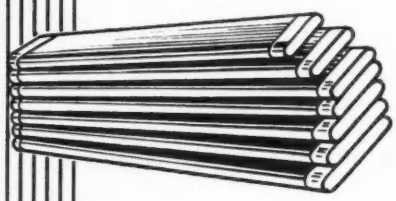

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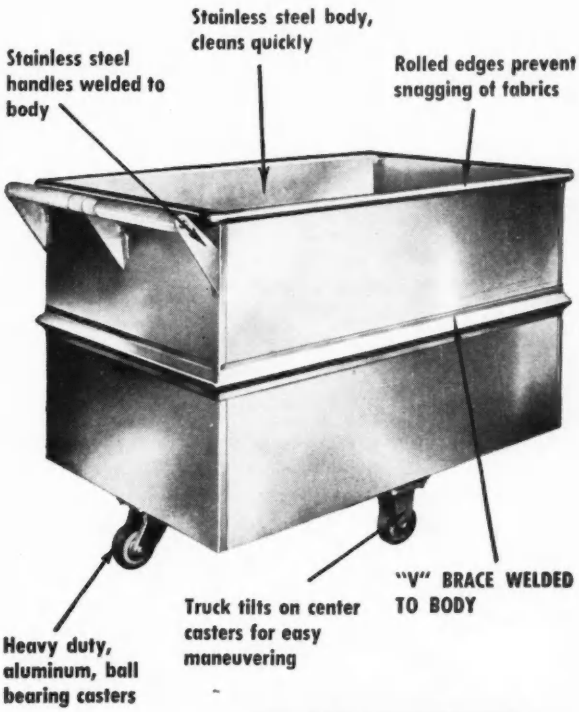
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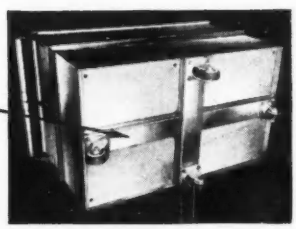

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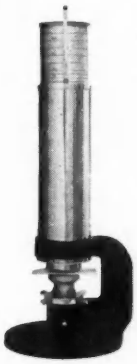
*Conforms to ASTM "Tent. Meth. of Test for Air Permeability of Text. Fabrics"—D737-43T



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TEXTILE CHEMIST: Well established manufacturer NYC area seeking textile chemist with extensive knowledge and experience in manufacture and development of textile auxiliaries. Knowledge of dyeing and finishing preferable. Excellent prospects for right man. Write Box No. 420.

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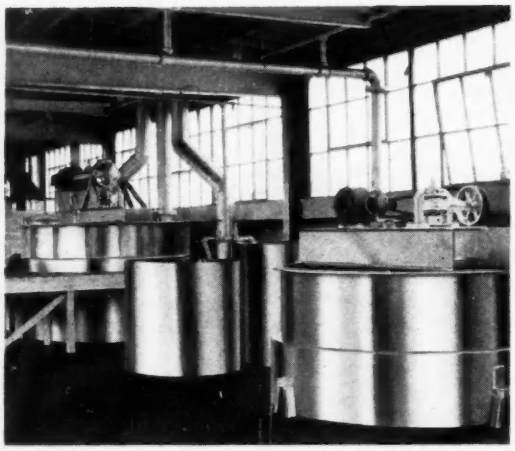

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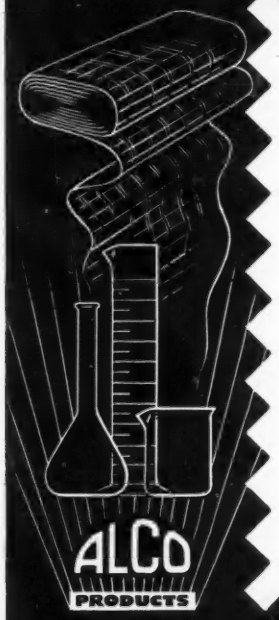

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INDEX TO ADVERTISERS

Aktivin Div., The (Heyden Chemical Corp.)	XXXVII
Alco Oil & Chemical Corp.	LIX
Allied Textile Printers, Inc.	XLV
Althouse Chemical Co., Inc.	
Amalgamated Chemical Corp.	XII
American Aniline Products, Inc.	IX
American Cyanamid Co. (Ind. Chem. Div.)	Second Cover
American Dyewood Co.	LV
Arkansas Company, Inc.	LX
Armour & Co.	XLVII
Arnold, Hoffman & Co., Inc.	XI
Atlantic Chemical Co., Inc.	
Atlantic Refining Company, Inc.	
Atlas Electric Devices Co.	LII
Barry Chemical Co.	LVIII
Becco Sales Corp.	
Bick & Co., Inc.	XLVIII
Blickman, Inc., S.	LIII
Burkart-Schier Chemical Co.	LVI
Butterworth Sons Co., H. W.	VI, VII
Calco Chemical Division, American Cyanamid Co.	
Calgon, Inc.	
Campbell Co., Inc., John	IV
Carbic Color & Chemical Co., Inc.	XXXVIII
Carbide & Carbon Chemicals Corp.	
Chem-Col Co., Inc.	LVIII
Ciba Company, Inc.	III
Colgate-Palmolive-Peet Co.	
Commonwealth Color & Chemical Co.	
Cutting Room Appliances Corp.	XLVI
Drew & Co., Inc., E. F.	
Du Pont de Nemours & Co., E. I.	
Dyestuff Division	
Fine Chemicals Division	X
Eclipse Piece Dye Works	XLVIII
Emery Industries, Inc.	LXII
Fancourt & Co., W. F.	
Geigy Company, Inc.	Front Cover
General Chemical Division, Allied Chemical & Dye Corp.	Third Cover
General Dyestuff Corp.	XIX
Girdler Corp., The	
Gross & Co., A.	VIII
Gurley, W. & L. E.	LV
Hart Products Corp.	
Hercules Powder Co.	XIII
Heyden Chemical Corp.	
Hinnekens Machine Co., Inc., The	XIV
Hooker Electrochemical Co.	XV
Houghton & Co., E. F.	XXIII
Interchemical Corp., Textile Colors Div.	XXXI
International Nickel Co., Inc.	
Interstate Dyeing & Finishing Corp.	LIV
Kali Mfg. Co.	LV
Kelco Co.	XXI
Koppers Co.	LIV
Laurel Soap Mfg. Co., Inc.	XXXVI
Leatex Chemical Co.	LI
Leeds & Northrup Co.	
Mathieson Chemical Corp.	
Maywood Chemical Works	XVI
Metalsmiths Div., Orange Roller Bearing Co., Inc.	LI
Monsanto Chemical Co.	XXV
National Aniline Division, Allied Chemical & Dye Corp.	XL
National Tube & Reel Corp.	LIII
Napco Chemical Co.	
Nova Chemical Corp.	XLVI
Nu-Dye & Finishing Co.	LI
Nyanza Color & Chemical Co., Inc.	XXXII
Onyx Oil & Chemical Co.	XVIII
Perkins & Sons, Inc., B. F.	
Pfizer & Co., Inc., Chas.	XXII
Procter & Gamble	
Refined Products Corp.	XVII
Richmond Oil Soap & Chemical Co., Inc.	XLIX
Riggs & Lombard, Inc.	XLVI
Rohm & Haas Company	
Rona & Co., Inc., L. L.	LIX
Royce Chemical Co.	Back Cover
Rumford Chemical Works	
Sandoz Chemical Works, Inc.	XLI
Scholler Bros., Inc.	LXI
Seyer Silk Dyeing & Finishing Co., Inc.	LIX
Sharples Chemicals, Inc.	XXXV
Socony-Vacuum Oil Co., Inc.	
Solvay Sales Div., Allied Chemical & Dye Corp.	XLIV
Standard Brands, Inc.	
Standard Chemical Products, Inc.	
Standard Corrugated Case Corp.	LII
Stein Hall & Co., Inc.	XX
Synthron, Inc.	XXVIII
Swift & Company	XXXIV
Tennessee Eastman Corp.	XXIX
Truitt Mfg. Co.	LVIII
Ultra Chemical Works, Inc.	XXVII
United Chemical Prod. Corp.	LIII
U. S. Stoneware Co.	XLIX
Vanderbilt Co., Inc., R. T.	XXIV
Van Vlaanderen Machine Co.	
Virginia Smelting Co.	
Wallerstein Co., Inc.	XXXIII
Warwick Chemical Co.	
Watson-Park Company	V
Winthrop-Stearns Inc.	LII
Wolf & Co., Jacques	XXVI
Young Co., J. S.	
Young Aniline Works	
Zinsser & Co., Inc.	
Zurn Co., O. F.	XLIV

XXXVII
LIX
XLV
XII
IX
nd Cover
LV
LX
XLVII
XI
LII
LVIII
XLVIII
LIII
LVI
VI, VII
IV
XXXVIII
LVIII
III
XLVI
X
XLVIII
LXII
ont Cover
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XIX
VIII
LV
XIII
XIV
XV
XXIII
XXXI
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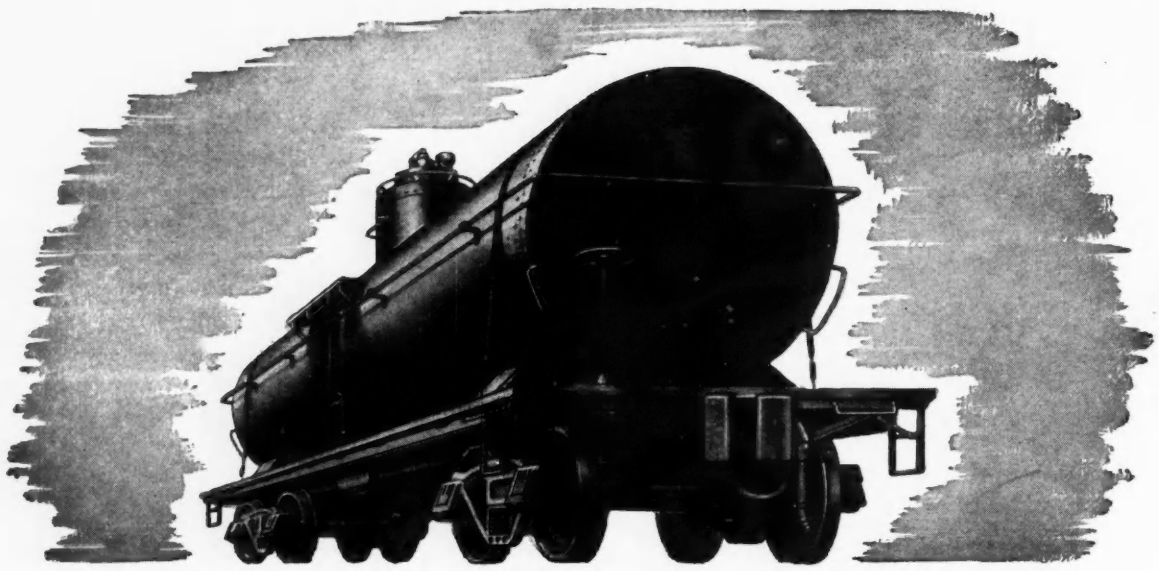

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